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The Colorado State Medical Society,

Edwin R. Axtell, M. D., Secretary,

Denver, Colorado.

TRANSACTIONS

OF THE

COLORADO

STATE MEDICAL SOCIETY

TWENTY-FIFTH ANNUAL CONVENTION.

BY-LAWS

AND

LIST OF MEMBERS.

DENVER, JUNE, 1895.

PUBLISHED FOR THE SOCIETY.

DENVER:
PRESS OF A. J. LUDDITT.
1895.

OFFICERS.

1895-6.

PRESIDENT,

I. B. PERKINS, M. D., ... DENVER

FIRST VICE-PRESIDENT,

A. J. ROBINSON, M. D., ... ASPEN

SECOND VICE-PRESIDENT,

LEE KAHN, M. D., ... LEADVILLE

THIRD VICE-PRESIDENT,

MARY L. AMBROOK, M. D., ... BOULDER

CORRESPONDING SECRETARY,

E. R. AXTELL, M. D., ... DENVER

RECORDING SECRETARY,

LAURA L. LIEBHARDT, M. D., ... DENVER

ASSISTANT RECORDING SECRETARY,

H. H. BUCKNUM, M. D., ... DENVER

TREASURER,

W. F. McCLELLAND, M. D., ... DENVER

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H. A. LEMEN, M. D., ... DENVER
JACOB REED, JR., M. D., ... COLORADO SPRINGS
SAMUEL A. FISK, A. M., M. D., ... DENVER
W. R. WHITEHEAD, M. D., ... DENVER
A. STEDMAN, M. D., ... DENVER
L. E. LEMEN, M. D., ... DENVER
W. E. WILSON, M. D., ... DENVER

COMMITTEE ON ADMISSIONS,

T. A. HUGHES, M. D., ... DENVER
MAURICE A. WALKER, M. D., ... DENVER
P. F. GILDEA, M. D., ... COLORADO SPRINGS
P. J. McHUGH, M. D., ... FORT COLLINS

STANDING COMMITTEES.

(Appointed by the President.)

1895-6.

EXECUTIVE—John M. Foster, J. W. O'Connor, P. V. Carlin, W. W. Grant, J. N. Vroom, S. G. Bonney, Clayton Parkhill, H. T. Pershing.

PUBLICATION—E. R. Axtell, Laura L. Liebhardt, M. A. Walker, A. Stewart Lobingier, H. W. McLauthlin, Thomas H. Hawkins.

FINANCE —Jesse Hawes, W. F. McClelland, R. F. Le Mond, E. G. Hickey, J. K. Clark, P. F. Gildea.

MEDICAL ETHICS—T. A. Stoddard, William J. Rothwell, G. Melville Black, Carl Johnson, H. R. Bull, W. W. Bulette, M. Harrison.

SANITATION AND PREVENTIVE MEDICINE—H. C. Crouch, A. A. Clough, Lee Kahn, Luke McLean, E. Stuver, C. K. Fleming, J. L. Clark.

MEDICAL SOCIETIES—S. D. Van Meter, George W. Miel, E. A. Sheets, W. M. Bonnet, Edward Jackson, W. C. Bane, T. H. Craven.

NECROLOGY—W. E. Wilson, J. W. Graham, E. J. Rothwell, B. J. Perry, Sol Kahn, J. L. Prentiss, A. M. Bucknum.

BY-LAWS—J. N. Hall, John T. Davison, C. F. Shollenberger, E. Y. Boyd, W. B. Davis, H. H. Howland, D. H. Coover.

COMMITTEE OF FIFTEEN (to confer with the American Public Health Association for the establishment of National Sanitaria)—William P. Munn, Hubert Work, Henry Sewall, S. A. Fisk, J. T. Eskridge, E. J. A. Rogers, Robert Levy, Charles Manly, Charles Denison, F. E. Waxham, J. N. Hall, A. Stedman, S. E. Solly, R. W. Corwin, Jesse Hawes.

DELEGATES TO THE AMERICAN MEDICAL ASSOCIATION.

DELEGATES.*		ALTERNATES.	
A. K. Worthington.	S. Arthur Bosanko.	Frank D. Green.	W. L. Freeman.
E. C. Rivers.	John Boice.	J. J. Powers.	W. J. Maxwell.
J. C. Herrick.	Abijah Johnson.	E. H. Fish.	C. J. Ferguson.
O. J. Pfeiffer.	W. A. Jayne.	J. W. Higgins.	B. C. Leavitt.
George H. Stover.	O. C. Huffman.	L. B. Brasher.	E. M. Marbourg.
W. P. Munn.	W. R. Whitehead.	Alfred R. Seebass.	A. W. Coleman.
J. P. Kelley.	W. B. Craig.	C. B. Lyman.	L. M. Walker.
P. V. Carlin.	Chas. Powers.	B. A. Arbogast.	David Thompson.
L. T. Durbin.	F. H. McNaught.	J. A. Whiting.	Chas. Jaeger.
C. Ruedi.	Geo. B. Packard.	A. J. McDonald.	W. T. Leggett.

*Delegates unable to attend are expected to notify the Secretary one month before the Association convenes. The Secretary will then notify the corresponding alternate. The President will appoint other alternates in place of those unable to attend.

EX-PRESIDENTS OF THE SOCIETY.

R. G. BUCKINGHAM, M. D.

W. F. McCLELLAND, M. D.

W. H. THACKER, M. D.

G. S. McMURTRIE, M. D.

H. K. STEELE, M. D.

EX-PRESIDENTS OF THE SOCIETY.

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T. G. HORN, M. D.
W. H. WILLIAMS, M. D.
A. STEDMAN, M. D.

EX-PRESIDENTS OF THE SOCIETY.

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F. J. BANCROFT, M. D.
P. R. THOMBS. M. D.

EX-PRESIDENTS OF THE SOCIETY.

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JESSE HAWES, M. D.

J. C. DAVIS, M. D.

J. W. GRAHAM, M. D.

EX-PRESIDENTS OF THE SOCIETY.

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J. W. COLLINS, M. D.

S. A. FISK, M. D.

J. T. ESKRIDGE, M. D.

EX-PRESIDENTS OF THE SOCIETY.

W. M. STRICKLER, M. D.
E. J. A. ROGERS, M. D.
W. E. WILSON, M. D.
HUBERT WORK, M. D.

LIST OF THE PRESIDENTS OF THE SOCIETY FROM ITS ORGANIZATION.

1871—*R. G Buckingham, M. D.,.....Denver
1872—W. F. McClelland, M. D.,.....Denver
1873—*G. S. McMurtrie, M. D.,.....Central
1874—*H. K. Steele, M. D.,.....Denver
1875—*W. H. Thacker, M. D.,.....Denver
1875—H. O. Dodge, M. D.,.....Boulder
1876—*W. H. Williams, M. D.,.....Denver
1877—T. G. Horn, M. D.,.....Colorado Springs
1878—A. Stedman, M. D., ...Denver
1879—B. P. Anderson, M. D.,.....Colorado Springs
1880—F. J. Bancroft, M. D.,.....Denver
1881—H. A. Lemen, M. D.,.....Denver
1882—P. R. Thombs, M. D.,.....Pueblo
1883—W. R. Whitehead, M D.,.....Denver
1884—Jesse Hawes, M. D.,.....Greeley
1885—*J. C. Davis, M. D.,.....Denver
1886—J. W. Gralram, M. D.,.....Denver
1887—S. E. Solly, M. D.,.....Colorado Springs
1888—S. A. Fisk, M. D.,.....Denver
1889—J. W. Collins, M. D.,.....Grand Junction
1890—J. T. Eskridge, M. D.,.....Denver
1891—W. M. Strickler, M. D.,.....Colorado Springs
1892—W. E. Wilson, M. D.,.....Denver
1893—E. J. A. Rogers, M. D.,.....Denver
1894—Hubert Work, M. D.,.....Pueblo
1895—I. B. Perkins, M. D.,.....Denver

*Deceased.

A LIST OF THE READERS OF PAPERS OF THE SESSION OF 1895.

Arbogast, B. A.
Axtell, E. R.
Bane, W. C.
Black, G. M.
Blaine, J. M.
Boyd, E. T.
Bulette, W. W.
Burns, T. M.
Coover, David H.
Crouch, H. C.
Davison, J. T.
Denison, Charles
Dorland, W. L.
Eskridge, J. T.
Fisk, Samuel A.
Foster, John M.
Freeman, Leonard
Gildea, P. F.
Grant, W. W.
Hall, John N.
Higgins, J. W.
Jackson, Edward
Jayne, W. A.
Johnson, Carl
Kahn, Sol. G.
Le Mond, R. F.
Lyman, C. B.
Manly, Chas. S.
McHugh, P. J.
McLauthlin, H. W.
Miel, G. W.
Munn, W. P.
Norbury, Prof. F. P.
Packard, Geo. B.
Parkhill, Clayton
Perkins, I. B.
Powers, Chas. A.
Ridlon, Prof. John
Robinson, G. W.
Rogers, E. J. A.
Rothwell, W. J.
Ruedi, Carl
Sewall, Henry
Shollenberger, C. F.
Stoddard, T. A.
Stover, G. H.
Stuver, E.
Taylor, T. E.
Thombs, P. R.
Van Meter, S. E.
Vaughan, Prof. Victor C.
Waxham, F. E.
Weiss, Loui
Whitney, H. B.
Wood, E. L.

A LIST OF THOSE WHO TOOK PART IN THE DISCUSSIONS OF THE SOCIETY'S PAPERS, SESSION 1895.

Adams, Edward
Arbogast, B. A.
Axtell, E. R.
Black, G. M.
Blaine, J. M.
Burns, T. M.
Coover, David H.
Crouch, H. C.
Davison, John
Davis, Will B.
Dorland, W. L.
Eskridge, J. T.
Failing, Dr.
Ferguson, C. J.
Freeman, Leonard
Freeman, W. L.
Grant, W. W.
Hall, J. N.
Harrison, M.
Jackson, Edw.
Johnson, C.
Kahn, Lee
Le Mond, R. F.
MacLean, L.
McLauthlin, H. W.
Miel, G. W.
Packard, Geo. B.
Parkhill, Clayton
Perkins, J. M.
Perkins, I. B.
Pershing, Howell T.
Powers, Chas. A.
Ridlon, Prof. John
Rothwell, W. J.
Ruedi, Carl
Sewall, Henry
Stoddard, T. A.
Stuver, E.
Taylor, T. E.
Walker, Maurice A.
Whitehead, W. R.
Wilson, W. E.

NOTE.

By resolution adopted during the session of 1872, The Colorado State Medical Society does not hold itself responsible for the doctrines or statements contained in any paper published in the "Transactions."

E. R. AXTELL, M. D.,
LAURA L. LIEBHARDT, M. D.,
M. A. WALKER, M. D.,
H. W. MCLAUTHLIN, M. D.,
A. STEWART LOBINGIER, M. D.,
THOS. H. HAWKINS, M. D.
Publication Committee.

BY-LAWS.

ARTICLE I.

Members.

Any regular graduate of medicine and surgery may become a member of this Society, who, by his adherence to the Code of Ethics of the American Medical Association, shows himself entitled to the confidence and fellowship of his medical brethren, and who, by his general conduct and mode of life, proves himself worthy of being a member of one of the learned and liberal professions.

ARTICLE II.

SECTION 1. Every candidate for membership in the Colorado State Medical Society shall make a written application to the Committee on Admission, and such application shall be accompanied by a diploma or certificate vouching for possession of the same from some regular Medical College of good standing, and his reputation shall be vouched for, in writing, by at least two members of the Society.

SEC. 2. If this committee shall report favorably thereon to the Society, the candidate shall be balloted for, and the approving votes of three-fourths of the members present shall be necessary to his admission.

ARTICLE III.

No individual who shall be under sentence of expulsion or suspension from any State or local medical society of which he may have been a member, or whose name shall have been, for non-payment of dues, dropped from the rolls of the same, shall be received as a member of this Society, or be allowed any of the privileges of a member, until he shall have been relieved

from the said sentence or disability by such Society, or shall have paid up all arrears of membership; nor shall any person, not a member and supporter of a local medical society, where such a one exists, be eligible to membership in the State Medical Society of Colorado.

ARTICLE IV.

Honorary membership may be conferred by a vote of two-thirds of the members present at any regular meeting of the Society, upon worthy and distinguished medical gentlemen.

ARTICLE V.

Initiation Fee.

All the members of the Society (honorary excepted) shall, at the time of their admission, sign the Constitution and pay an initiation fee of $5, nor shall membership be consummated until the provisions of this article are complied with.

ARTICLE VI.

Assessments.

All members shall pay such annual assessments as may be made from time to time by the Society. Said assessments to fall due at the annual meeting when made.

ARTICLE VII.

Officers.

The officers of this Society shall be a President, three Vice-Presidents, designated and elected specially as first, second and third Vice-Presidents, a Corresponding Secretary, a Recording Secretary, a Treasurer and a Standing Committee on Admission of Members, all of whom shall be elected annually by ballot, and by a majority vote, at the regular meeting, to serve until their successors are duly elected and qualified.

ARTICLE VIII.

Board of Trustees.

The members of this Society shall also, at each annual meeting, elect a Board of Trustees, consisting of seven members—of which Board the officers-elect of this Society may constitute a part—in whom shall be vested the government of the Society and the management of its business. The Board shall be authorized to elect their own officers, and shall serve until their successors are duly elected and qualified.

ARTICLE IX.

Committees.

The following Standing Committees shall be annually appointed by the President: 1st, an Executive Committee; 2nd, a Committee on Finance; 3rd, on Publication; 4th, on Medical Ethics; 5th, on Medical Societies; 6th, on Necrology; 7th, on Legislation; 8th, on By-Laws.

ARTICLE X.

Duties of Officers.

It shall be the duty of the President to preside at all regular meetings of the Society, enforce a due observance of the Constitution and By-Laws, see that all members of committees and officers perform their respective duties, appoint all committees not otherwise provided for, give the casting vote only, sign diplomas and all other official documents requiring his signature, and perform such duties as pertain to his office by usage and custom.

ARTICLE XI.

The Vice-Presidents shall assist the President in the performance of his duties, and in his absence shall preside in order of their rank.

ARTICLE XII.

SECTION 1. The Corresponding Secretary shall conduct the correspondence of the society; notify the Chairman of com-

mittees of their appointments, and request them to answer in writing whether or not they accept; give due notice of annual meetings; sign diplomas, and certify to all official acts requiring the same; receive the signature and initiation fees of all duly elected members, and the annual dues of all members, transferring all moneys so received to the Treasurer; have the charge of all books, manuscripts, instruments, preparations and other scientific property belonging to the Society, and shall keep a catalogue of the same, and report on the condition of the same at the annual meetings. The Corresponding Secretary will receive, as compensation for the faithful discharge of his duties, the sum of one hundred dollars ($100) per annum.

SEC. 2. The Recording Secretary shall keep correct minutes of the proceedings of the Society, and make a full report of the discussions on all papers, take charge of the minute books and other documents and papers read before the Society, immediately at the close of each session, and keep them during the intervals, subject to the inspection of any member desirous of so doing. If necessary, in order to give a full and correct report of all proceedings and discussions, he shall, at his own expense, furnish a stenographer during the sessions of the Society. The Recording Secretary shall receive, as compensation for the faithful discharge of his duties, the sum of fifty dollars ($50) per annum.

ARTICLE XIII.

The Treasurer shall receive all moneys due to the Society, and pay all bills endorsed by the Finance Committee and countersigned by the President, keeping correct accounts of the same and making a full and detailed report at the annual meeting.

ARTICLE XIV.

Any member who shall fail to pay his dues for a period of three years shall be dropped from the roll of membership, and so notified by the Secretary.

ARTICLE XV.

Duties of Committees.

Standing committees shall keep regular minutes of their proceedings, and furnish an authentic copy to the Secretary, and make a written report at the annual meeting.

ARTICLE XVI.

It shall be the duty of the Committee on Admission, upon receiving the names of candidates for membership, to make inquiry and report such as may be found worthy, to the Society, which may thereupon elect him. Should the committee fail to report upon such nominations submitted to them, any members having made such nominations may renew the same directly to the Society, in which case a vote of four-fifths of the members present shall be requisite to constitute an election.

ARTICLE XVII.

The Executive Committee shall digest and prepare the business of each meeting, provide suitable rooms for the purpose of the Society, recommend plans for the promotion of its objects, and in all things protect and look after the general interests of the Society

ARTICLE XVIII.

The Committee on Finance shall superintend the monetary affairs of the Society, inspect and audit all bills and accounts of the Treasurer, and make such an assessment, by a *pro rata* tax upon the resident members, as may be necessary for the incidental expenses, subject, however, to the approval of the Society.

ARTICLE XIX.

The Committee on Publication shall superintend the printing of such papers, with the full discussion thereon as may be ordered to be published, so that they may be issued on uniform paper. The publication of the transactions shall not be per-

mitted until final revision of proof and its adoption, with permission to print, signed by a majority of the Committee on Publication, and under the title, "*Transactions.*"

Article XX.

The Committee on Ethics shall hear all complaints of any breach of etiquette or violation of medical ethics. It shall decide all questions of ethics submitted to it. If any member shall be charged in writing by any other member of the Society with any violation of the provisions of the By-Laws, or with unprofessional conduct, a copy of such charge shall be furnished him; himself and his accuser cited to appear; when the committee shall proceed to hear the case, reserving its decision to be reported to the Society, when its action may be affirmed by a vote of two-thirds of the members present.

Article XXI.

The Committee on Medical Societies shall consider and report on the organization of such medical societies as desire to become auxiliary to the State Medical Society, and generally take charge of this department, making at each annual meeting as complete a report as practicable.

Article XXII.

The Committee on Necrology shall report the death of any member of the Society, with a brief biography, and this report shall be published in the Transactions.

Article XXIII.

The Committee on Legislation shall report to the Society any matter concerning its welfare which requires State legislation, and see that the same is properly presented to the legislature for action, if so instructed by the Society.

Article XXIV.

The Committee on By-Laws shall report to the Society any needed change in its By-Laws.

ARTICLE XXV.

Discipline.

A member may be expelled, suspended or reprimanded by a vote of two-thirds of the members present at any annual meeting, which vote shall be had in consequence of a report from the Committee on Ethics, and which may be confirmed by a majority of the Board of Trustees.

ARTICLE XXVI.

Any member wishing to withdraw from the Society shall be permitted to do so on his written request, after he shall have presented the Treasurer's receipt for all moneys due.

ARTICLE XXVII.

The regular meeting shall be held annually, and shall commence on the third Tuesday of June of each year. The place of meeting shall be Denver, and a banquet shall be given on the evening of the last day, as arranged for by the Executive Committee.

ARTICLE XXVIII.

Special meetings shall be called at any time by the Board of Trustees.

ARTICLE XXIX.

At all meetings the presence of nine resident members shall be necessary to constitute a quorum.

ARTICLE XXX.

The order of proceedings shall be as follows:

1. Opening of meeting by prayer.
2. Reading of minutes by Secretary.
3. Annual address by retiring President.
4. Annual report of Officers and Standing Committees.
5. Election of Officers.
6. Annual and Special Committees' report.

7. Voluntary papers, contributions, reports.
8. Annual assessment shall be laid by resolution.
9. Miscellaneous business.
10. President-elect shall assume the chair and announce committees for succeeding year.

ARTICLE XXXI.

These By-Laws may be repealed, annulled, altered or amended at a regular meeting, on the recommendation of two-thirds of the members present.

MINUTES

OF THE

TWENTY-FIFTH ANNUAL SESSION

OF THE

Colorado State Medical Society

HELD IN

DENVER, COLO., JUNE 18, 19 AND 20, 1895.

TUESDAY, JUNE 18th.

Morning Session.

The Society was called to order at 10 A. M., in the "Ladies' Ordinary" of the Windsor Hotel, Eighteenth and Larimer streets, by the President, Dr. Hubert Work.

Prayer was offered by Rev. George M. Darley.

The minutes of the previous meeting were approved.

The Executive Committee, through Dr. Robert Levy, submitted the programme of exercises.

The Publication Committee, through its Chairman, Dr. C. K. Fleming, submitted the following report:

"It was found necessary to publish an edition of 400 volumes of the transactions, to meet the requirements of our growing society and our exchange list—a volume of the Transactions being sent to every State Medical Society, as well as to the National Societies and prominent Libraries.

"The entire edition was bound in cloth, and we feel that the Society should be justly proud of the work, which compares favorably with books of similar nature."

The report was ordered spread on the minutes.

The Corresponding Secretary reported as follows:

"The Society at present has a total membership of 227, 14 members of which, according to Article XIV of our By-Laws, will be dropped for delinquency, after due notification, at the close of this meeting. During the year we have lost 14 members; 11 being dropped for non-payment of dues, and three by resignation.

"Out of the 57 members elected at the previous meeting, five failed to complete their membership by neither paying their initiation fee nor signing the Constitution, consequently their names fail to appear on the roll of membership.

"The amount of dues collected from members and applicants during the current year, viz: June 21, '94, to June 18, '95, and turned over to the Treasurer, Dr. McClelland, is $630."

The Recording Secretary submitted the minutes of the session of 1894 as his report.

The Treasurer, Dr. W. F. McClelland, reported as follows:

Balance on hand June 20, 189_	$ 25.00
Annual dues collected	1,046.53
Total	$1,071.53
Disbursements during year	800.26
Cash balance on hand	271.27
Total	$1,071.53

It was moved and carried that the report be received as read, and referred to the Finance Committee.

The Committee on Medical Ethics reported through Dr. John Hall that no infraction of medical ethics had been brought to the notice of the committee during the past year.

The first paper of the session was read by Dr. Robert F. Le Mond, of Denver. It was entitled "The Relationship Existing Between the Eye and Diseases of the Brain." The paper was discussed by Drs. Pershing and Jackson.

The paper of Dr. Wilbur W. Bulette, of Pueblo, entitled "Etiology of Deflections of the Nasal Septum," was read by title.

"Observations Regarding Eye Strain and its Relief," was the title of a paper read by Dr. Edward Jackson, of Denver.

Dr. William C. Bane, of Denver, read a paper entitled "Inflammation of the Middle Ear with Involvment of the Mastoid. Report of Cases."

Dr. P. F. Gildea, of Colorado Springs, read a paper entitled; "Laryngeal Infiltration."

"An Improved Wright's Snare," was the title of a paper read by Dr. E. T. Boyd, of Leadville. It was followed by an exhibition of the instrument.

Dr. David H. Coover, of Denver, read a paper on "Reflex Irritation Following Eye Strain." The subject was discussed by Drs. Black, Le Mond, Jackson and Coover.

"Angio-neurotic Oedema of the Occular Conjunctiva," was the subject considered by Dr. G. M. Black, of Denver. It was discussed by Dr. Edward Adams, of Kansas City, Mo.

Dr. John M. Foster, of Denver, presented a paper entitled "Blepharoplasty by Thiersch Grafting." A patient was shown upon whom the operation had been performed.

The Chairman of the Finance Committee, Dr. I. B. Perkins, reported for the committee as follows:

"We have audited the books and reports of the Treasurer, and find them correct as reported to the Society by that officer."

Dr. E. M. Marbourg, Chairman of the Committee on Medical Societies Throughout the State, submitted the following report. It was read by the Reporting Secretary:

"As Chairman of your Committee upon Medical Societies, I have endeavored to secure reports from every county in the State, but have succeeded in only eliciting eight reports, as opposed to nine of last year. Some of the societies which reported last year have failed to do so this, while others seemed to have had new life infused into them, and started out afresh. The following Societies reported:

THE DENVER AND ARAPAHOE MEDICAL SOCIETY.

J. N. HALL, M. D., President.
H. H. BUCKNUM, M. D., Secretary.

Total attendance, 485. Papers read, 28.
Number of meetings, 16. Cases reported, 13.
Average attendance, 30. Members elected, 20.

(Signed) H. H. BUCKNUM, M. D., Secy.

THE DENVER CLINICAL AND PATHOLOGICAL SOCIETY.

A. S. LOBINGIER, M. D., President.
LEWIS M. WALKER, M. D., Secretary.

Number of members, 40.
Number also members of State Medical Society, 30.
Number of meetings, 8.
Average attendance, 22.
Number of cases reported, 66.
Number of pathological specimens and surgical apparatus exhibited at meetings, 19.
Meetings, second Friday of each month.

(Signed) L. M. WALKER, M. D., Secy.

THE DENVER MEDICAL COLLEGE ALUMNI ASSOCIATION (Incorporated).

L. T. DURBIN, M, D., President.
MAURICE A. WALKER, M. D., Secretary.

Number of members, 100. Number of papers, 16.
Average attendance, 16. Specimens exhibited, 8.

(Signed) MAURICE A. WALKER, M. D., Secy.

EL PASO COUNTY MEDICAL SOCIETY.

D. I. CHRISTOPHER, M. D., President.
P. F. GILDEA, M. D., Secretary and Treasurer.

Number of meetings, 12. Number of members, 29.

As our Society takes a leading part in questions concerning the municipality, there were few papers read during the past year. Papers were:

"Glenwood Springs," Dr. E. Hobbouse.

"The Water Supply of Colorado Springs," Prof. Strebie.

"The Nasal Trephine," Dr. G. Melville Black, Denver.

"Discussion Concerning the Formation of a Board of Health," the Society.

"Vaginal Hysterectomy," Dr. Craig, Denver.

"Pneumonia," Dr. J. T. Estill.

"The Best Method of Treating Pulmonary Hemorrhage," the Society.

(Signed) DR. P. F. GILDEA, Secy.

FREMONT COUNTY MEDICAL SOCIETY.

J. M. BRADBURY, M. D., President.
F. N. CARRIER, M. D., Secretary.

Papers:—

"Tuberculosis and Treatment," Dr. Carrier.

"Eye Strain," Dr. Peare.

"Medical Ethics," Dr. Peare.

"Antitoxine," Dr. Moore.

(Signed) F. N. CARRIER, M. D., Secy.

THE LAKE COUNTY MEDICAL ASSOCIATION.

S. ARTHUR BOSANKO, M. D., President.
LEE KAHN, M. D., Secretary.

Number of members, 13.
Number of members of State Medical Society, 7.
Number of meetings, 16.
Meetings are held every second Friday evening.
Average attendance, 8.
Papers read, 6.

Cases reported, 4.

Papers:—

"Adenoids," Dr. E. T. Boyd.

"A Case of Trephining for Traumatic Epilepsy," Dr. S. Arthur Bosanko.

"Abortion: Its Causes and Treatment," Dr. A. L. Flint.

"Diphtheria," Dr. B. S. Galloway.

"Typhoid Fever," Dr. D. Heimburger.

"Treatment of Lobar Pneumonia," Dr. S. P. Johns.

"Sub-Involution," Dr. Lee Kahn.

"Inflammation of Uterine Appendages," Dr. Sol Kahn.

"Treatment of Recent Wounds," Dr. J. J. Crook.

"Case of Transverse Fracture of Patella," Dr. J. Ernest Meiere.

"Case of Acute Gangrenous Phlegmon and a Case of Acute Systemic Blood Poisoning," Dr. S. Arthur Bosanko.

On October 8th, 1894, the Lake County Medical Association was resuscitated after a dormant period of six years. Since 1888 we have lost no members by death, but seven have changed their field of operation, and six new ones have joined.

We have had the fee bill revised and enlarged, and the by-laws have been changed.

We are having very interesting meetings, and the members are all working together for the good of the Association.

(Signed) LEE KAHN, M. D., Secy.

PUEBLO COUNTY MEDICAL SOCIETY (Incorporated).

C. O. RICE, M. D., President.
MARY F. BARRY, M. D., Secretary.

Number of members, 27.
Average attendance, 14.
Number of meetings, 10.
Number of papers read, 9.
New members, 6.

Titles of Papers:—

"A Study of the Heart and Pulse."
"Physiological Rest as a Therapeutic Agent."
"Prevention of Disease."
"Treatment of Chronic Disease of Uterine Adnexa."
"Treatment of Alcoholism by the so-called Gold Cure."
"Myelitis—Outlines on Causation and Treatment."
"Tubercular Laryngitis."
"Traumatisms of the Extremities."

(Signed) MARY F. BARRY, M. D., Secy.

THE ALUMNI ASSOCIATION OF GROSS MEDICAL COLLEGE, DENVER, COLORADO, (Incorporated.)

SOLOMON RINGOLSKY, M. D., President.
HATTIE BEDORTHA, M. D., Secretary.

Number of members, 74.
Number of meetings, 12 monthly and 1 annual.
Average attendance, 10.
Number of papers read during year, 8.

Titles of Papers:—

"Treatment of Gonorrhœa," Dr. J. Smith.
"Hyperæmia of the Conjunctiva," Dr. Bradner.
"Summer Complaint," Dr. E. C. Hill.
"Foreign Bodies in the Eye and Ear," Dr. A. E. Grant.
"Vaginal, Uterine and Colon Irrigation," Dr. T. M. Burns.
"Chronic Hypertrophic Rhinitis," Dr. Hattie Bedortha.
"Chemical Incompatibilities," Dr. E. C. Hill.
"Diseases of the Rectum," Dr. R. L. Thorp.

In addition, there have been three demonstrations before the Society, four discussions, and twenty-one cases reported.

Number of members who are members of the State Society, 4.

Date of meetings—Monthly meetings on first Thursday of each month. Annual meeting on day following commencement exercises of Gross Medical College.

Membership limited to graduates of Gross Medical College.
New members, 21.
When organized, April 11th, 1894.

(Signed) HATTIE BEDORTHA, M. D., Secy.

It is to be regretted that more Societies did not make reports, but it is hoped that like some of the Societies that have reported, that new energy will be infused into them during the coming year. The Lake County Society has certainly done good work, and their report is the best submitted this year.

The Committee on Legislation and Medical Education in Colorado reported through Dr. R. W. Corwin, as follows:

"In his address to the Twenty-fourth Annual Session of the State Medical Society of Colorado, President Rogers suggested that better laws for the regulation of the practice of medicine be enacted, and that the three medical schools located in Denver be consolidated. Acting upon this suggestion, Dr. Work appointed a committee consisting of Doctors Hawes, of Greeley, Hughes, of Denver, Solly, Hart and Robinson, of Colorado Springs, Thombs and Corwin, of Pueblo, whose duty it should be to carry out the idea of ex-President Rogers, as far as possible, and report the same at this meeting.

"The Committee herewith respectfully begs to submit the following report:

"After several meetings of the committee, and a general meeting held in Denver, to which were invited a large number of medical men, representing the different factions and schools of medicine, a bill containing the following salient points was drafted and introduced into the Legislature: That the three State Medical Societies of Colorado, Regular, Homeopathic and Eclectic, shall each recommend to the Governor of the State fifteen of its members, from whom the Governor shall make his appointments to three State Medical Examining Boards. By this plan it was thought the best material from each school of medicine would be represented without favoritism or partiality. In addition to the three Boards of Examiners, the bill provided

for a Medical Council of Five, to be composed of the Presidents of the three boards, the Attorney General of the State, and a secretary who shall be a graduate of medicine, appointed by the Governor.

"The duties of the Council to be, to arrange for and supervise all examinations, and settle any questions or differences.

"Again, absolute impartiality was exhibited, each school being represented; no one could know the Governor's choice of secretary, and the persuasion of the attorney general, in doubt. Some objected to the council saying that the examining board would not be independent and the members would be but figureheads, and, as such, it would be no honor to be a member of this board. The first is absurd; and the answer to the second—even if true—is, Does a person accept the position of Medical Examiner from selfish motives and honor, or for the good of the profession and the benefit of the people?

"The bill further provides, that after its enactment, that every person not then practicing medicine who wished to do so shall pass an examination before the State Board of Medical Examiners, receive a certificate, which shall be duly recorded in the County in which he wishes to practice.

"Without annoying you with details, it might be added that the bill presented to the legislature by the committee was framed after the medical bill of Pennsylvania (which we are informed operates very satisfactorily).

"In due time the bill was presented to the legislature. Many of you will no doubt remember its effect upon the quacks of the State, and especially upon the irregulars of the city of Denver. A howl went up that was long and mighty. Then there came before the legislature bill after bill; some asking for more and better laws, others requesting less law, and a number demanding no protection from the quacks, charlatans and vandals, until a score or more of medical propositions appeared before the house. Your committee, with a number of friends, appeared before the house committee, and while the latter was not unanimous the majority promised to report the bill out and fulfill that promise. By this time so much pressure had been brought to bear upon legislators by irregulars, and, we are

sorry to hear, also by regulars who had axes to grind and nests to feather, that it became impossible to pass any bill and the whole matter went by default. This is not the first time good bills have failed to pass, and it will not be the last time, unless harmony be restored in our own ranks. We shall always find quacks and charlatans opposed to higher education and laws to prevent the ignorant and impostors from practicing medicine, but there is no good reason why the members of our own school should stand in paths leading to success and obstruct every avenue by which the desired goal may be reached. While we found that the irregulars had some influence, we also found that they could not have accomplished anything had it not been for the opposition and lukewarm support of regulars due to petty strife, absurd jealousies and personal gains. Never was there a better opportunity to pass a good medical bill than there was this year; never will we find a legislature more willing to listen to our requests than the last. They were considerate and patient, and wished to help us, until they became disgusted with the dissention in our own ranks; and, as one legislator remarked after hearing complaint after complaint and criticism after criticism by the members of our own school about bills introduced by regulars, 'You need have no fear of any bill going through until you fellows get together.'

"In conclusion, your committee begs to suggest that another effort be made to regulate the practice of medicine in our State.

"That the work be begun at once, and those having the matter in charge co-operate with the Association of State Medical Examining Boards, whose objects are to establish an uniform medical schedule of requirements for all medical colleges and examining boards, and to assist in perfecting a higher medical education; and your committee hopes when the next bill is introduced into the legislature that every honorable practitioner will work for its passage.

"Let not those in the State outside of Denver think it is a Denver move; let not those in Denver say they are not being duly considered; let not the schools of medicine be afraid to have their graduates appear before the Examining Board for

examination; let not those who are not members of the State Medical Societies obstruct the way; let not those aspiring to honors on the examining boards feel slighted. But let every person in sympathy with higher education and greater protection to the public, discard personal matters and overlook slight differences of opinion, and work with all their might and main for the good of the profession and the benefit of the people.

"Regarding the consolidation of our medical schools your committee has accomplished but little. It has done enough, however, to fully appreciate the delicacy of the situation and the many difficulties and embarrassing complications involved. While it has no definite plan to suggest by which an union may be affected, it nevertheless believes such an union may be achieved and most heartily recommends that it be done, and that too, as soon as possible.

"The feeling existing between the three medical schools of Denver, casts its shadow over the medical population of the entire State. Each school having its friends and enemies, there is kept up a perpetual discord which is of no benefit to the profession.

"While we have no criticism to make upon the schools, their able faculties and management, we do believe one school could meet the demands of our State at the present time, and that one school would be stronger than any of the three under the present conditions, and that a consolidation of the schools would be the means of concentrating the forces of the regular profession in our State and of placing us in far better condition to accomplish that which our profession is called upon and expected to perform.

"We feel assured that the gentlemen connected with these schools are broad-minded enough to listen to a proposition tending toward this end; that they cannot but appreciate the benefits to be derived from such an union; that all are working for the good of the profession and therefore each would be willing to sacrifice his might, if necessary, to bring about best results.

"With this spirit manifest, your committee believes a plan can be devised by which all now connected with these schools

can be supplied with better and stronger positions, thus not only improving the condition of each member of the faculty but elevating the medical educational advantages of our State, placing us in better light before the world, harmonizing our interests, concentrating our energies and strengthening our forces, thereby making us more useful, efficient, competent and powerful as a professional body."

The Executive Committee through Doctor Levy made a number of announcements.

Dr. W. P. Munn presented the following motion:

"*Moved*, That the report of the committee on legislation and medical education be received; that the thanks of the Society be extended to the members of the committee, and that it be resolved that it is the sense of this Society that the committee as at present constituted should be continued, and that the incoming president shall reappoint the same committee with the same functions." The motion was seconded and carried.

The following papers were then read by title: "Suppurative Middle Ear Inflammation in Connection with Pulmonary Tuberculosis," Dr. George Cleary, of Denver. "Paralysis of the Ocular Muscles," by Dr. F. D. Green, of Pueblo, and a paper with title unannounced, by Dr. E. M. Marbourg, of Pueblo.

All of the papers presented were referred to the Publication Committee.

The President announced that Dr. Clayton Parkhill, of Denver, would hold a surgical clinic at St. Luke's Hospital at 12:30.

The morning session was then adjourned.

Afternoon Session.

At 2:30 the Society convened.

A large attendance was present to hear Prof. John Ridlon, of Chicago, Illinois, deliver an address on "The Diagnosis and Principles of Treatment of Hip Joint Disease." The subject of the address was discussed by Doctors Grant, Packard, Freeman and Whitehead.

It was moved and carried that the society tender to Professor Ridlon a vote of thanks for his able and interesting address and that he be chosen an honorary member of the Society.

"Treatment of Lateral Curvature of the Spine," was the title of a paper read by Dr. George B. Packard, of Denver. It was discussed by Doctors Ridlon and Whitehead.

Dr. S. D. Van Meter, of Denver, read an article entitled, "Circumcision." It was followed by a paper by Dr. Charles A. Powers, of Denver. The title of the paper was, "Cancer of the Rectum, its Excision by the Method of Kraske and modifications thereof, with report of cases."

Dr. E. J. A. Rogers, of Denver, presented a paper entitled "A Review of Some Interesting Points in Surgery Observed during the Six Months, ending June, 1895." It was discussed by Doctors Stuver, Packard and Freeman.

"The Surgery of Mines," was the title of a paper by Dr. R. W. Corwin, of Pueblo. It was read by title.

Dr. George W. Miel, of Denver, presented a paper on "Resection of the Femur for Angular Deformity." The paper was illustrated by diagrams.

"Spontaneous Dislocation of the Hip Joint in Connection with Typhoid Fever," was the title of the paper presented by Dr. Leonard Freeman, of Denver.

A note was received from Dr. Charles Denison, of Denver. stating that owing to a fractured limb he could not be present and that he wished the reporting secretary to read his paper for him. It was moved that owing to lack of time that the paper be read by title. Carried. "Favorable results from Koch's Tuberculin in other than Pulmonary Tuberculosis," Dr. Charles Denison, Denver.

"Cases of Appendicitis," was the title of a paper read by Dr. W. W. Grant, of Denver.

His paper was discussed by Doctors Powers and Anderson.

It being now about 5:45 p. m. it was moved and carried that the Society adjourn until the following morning at 9 o'clock, and that the four remaining papers of the afternoon's program be read at that time.

The papers of the afternoon were referred to the Publication Committee.

The Executive Committee announced a conversazione in the parlors of the hotel at 8 p. m.

WEDNESDAY, JUNE 19th.

Morning Session.

President Work called the meeting to order at 9:15 a. m.

Dr. C. B. Lyman, of Denver, had his paper, "The Treatment of Compound Fracture," read by title.

Dr. W. P. Munn, of Denver, read a paper entitled, "Enlarged Prostate and Its Surgical Treatment." It was discussed by Dr. Leonard Freeman.

"Is Bicycle Riding a Cause of Impotency?" was the title of a paper presented by Dr. John T. Davison, of Denver. It was discussed by Doctors Lee Kahn and Leonard Freeman.

"Alopecia Prematura," was the title of a paper read by Dr. J. M. Blaine, of Denver.

The President announced that Prof. Frank P. Norbury of Jacksonville, Illinois, who was down on the program for an address on, "The Nervous and Mental Derangements of Young Women," was ill, and could not be present at the meeting.

His address was read by title, and it was moved and carried that he be elected an honorary member of the Society, and that through the secretary the Society express its regrets at his absence and illness.

Dr. P. R. Thombs, of Pueblo, began the regular order of the program by reading a paper entitled, "Epilepsy; Its Cause and Treatment." It was discussed by Doctors Eskridge, Wilson and Burns.

"A Case of Myxoedema," was the title of the paper read by Dr. W. J. Rothwell, of Denver.

Dr. E. R. Axtell, of Denver, read a paper on "Toxic Paraplegia." It was discussed by Doctor Eskridge.

A Case of Pseudo-Hypertrophic Muscular Paralysis was next presented by Dr. J. W. Higgins, of Denver.

Dr. J. T. Eskridge, of Denver, read an abstract of his paper entitled, "Diagnosis of Chronic Cerebral Abscess." It was discussed by Dr. L. Freeman.

"Opium Poisoning," was the title of a paper read by Dr. Carl Johnson, of Denver. It was discussed by Doctors Eskridge, Hall, Axtell and M. A. Walker.

A motion to adjourn was put and lost.

Dr. B. A. Arbogast, of Breckenridge, then read a paper on "Castration, the Remedy for Crime." It was followed by a paper entitled, "Asexualization for the Limitation of Disease and the Prevention and Punishment of Crime" by Dr. E. Stuver, of Rawlins, Wyoming. The subject embodied in the papers was discussed by Doctors Blaine, Stoddard and Davison.

Afternoon Session.

At 2 P. M. the Society convened. A large attendance was present to hear Prof. Victor C. Vaughan, of Ann Arbor, Michigan, address the meeting on the subject of, "The Restriction of Tuberculosis."

It was then moved and carried that all discussion on the papers concerning tuberculosis be deferred until the general discussion on the afternoon's Symposium.

Dr. E. R. Axtell, of Denver, presented a case of a child with chronic internal hydrocephalus and spina bifida.

"The Germ Theory," was the title of a paper presented by Dr. E. L. Woods, of Pueblo.

Dr. G. W. Robinson, of Trinidad, had his paper on "Pneumonia" read by title, and so did Dr. Charles H. Manly, of Denver, who presented a paper entitled, "The Value of Rational Methods in the Early Diagnosis of Phthisis."

Dr. Charles Denison, of Denver, presented, through Dr. F. E. Waxham, his paper entitled "Antiphthisine, Prof. Klebs' New Tuberculine Product. Report of Cases." It was moved and carried that the paper be read by title.

It was moved that "there shall be elected at once, by vote of the Society, a committee of seven members, no more than two of whom shall be from any one county, who shall be a nominat-

ing committee, to present to the Society nominations for the offices of the Society as follows: Not less than three candidates for President; three candidates for Corresponding Secretary; three candidates for Recording Secretary; and as many as they may see fit for all other offices.

"The action of the committee shall not prevent the nomination of any other member.

"The candidates as recommended shall be voted for by an informal or formal ballot, as has been customary."

The motion was carried.

The following nominations were then made: Drs. Munn, Miel, Hawkins, Foster, Carlin, Waxham and M. A. Walker, of Denver; Dr. Boyd, of Leadville; Dr. Beshoar of Trinidad; Dr. McLean, of Pueblo; Dr. Perry, of Aspen, and Dr. Law, of Greeley.

It was moved and carried that the nominations close. Moved that those nominated from outside of Denver be elected by acclamation. Carried.

Moved that the original motion be amended so that those nominated from Denver be allowed to serve on the committee. Carried.

The Symposium on the Extinction of Communicable Diseases was opened by an "Introductory" by Dr. W. P. Munn, of Denver.

Dr. H. C. Crouch, of Denver, followed with a paper entitled, "The General Bacteriologic Status."

Dr. Henry Sewall, of Denver, presented a paper with the title, "As to Tuberculosis and its Existence in Colorado."

The next paper of the Symposium was read by Dr. F. E. Waxham, of Denver. It was entitled, "Is Diptheria doomed?"

"Scarlet fever and the Public Schools" was the subject of a paper then presented by Dr. C. F. Shollenberger, of Denver.

Dr. S. A. Fisk, of Denver, addressed the Society on the subject of, "Typhoid Fever and the Agencies that Contribute to It."

"Surgical Infective Diseases" was considered by Dr. Leonard Freeman, of Denver.

Before the General Discussion was opened, it was moved

and carried that the thanks of the Society be tendered to Prof. Vaughan for his able paper and that he be elected an Honorary Member of the Society.

The General Discussion on the Symposium was opened by Prof. Victor C. Vaughan. The following took part in the discussion, Drs. Arbogast, Miel, Axtell, Stuver, Davis, Ferguson, W. L. Freeman, W. J. Rothwell, Ruedi and Dr. Failing, of Grand Rapids, Michigan.

Moved and carried that the Secretary be instructed to send the Greetings of the Society to Drs. H. A. Lemen and W. M. Strickler, absent members on account of sickness.

Moved and carried that the Discussion on The American Public Health Association be postponed until Thursday.

The Executive Committee announced a theater party at Manhattan Beach at 8 P. M.

The papers of the day were referred to the Publication Committee.

THURSDAY, JUNE 20th.

Morning Session.

The Society was called to order at 9 A. M.

Dr. John Hall, of Denver, read a paper entitled, "Etiology and Treatment of Functional Cardiac Diseases."

Dr. Carl Ruedi, of Denver, presented a paper entitled "Loco-weed; (*Astragalus Mollisimus*). A Chemico-Toxicological Study."

The paper was discussed by Drs. Hall, Burns, Davison and McLean.

"Hydrotherapy; Its Application in Diseases of Children," a paper by Dr. C. J. Ferguson, of Denver, was read by title.

Dr. H. B. Whitney, of Denver, read a paper, "Two Cases of Abcess of the Liver, with Remarks on Diagnosis." It was discussed by Drs. McLauthlin and Harrison.

"Mal-Assimilation," was the subject presented by Dr. W. L. Dorland, of Pueblo. It was discussed by Drs. Axtell and Crouch.

"Dilation of the Stomach," was the title of a paper read by Dr. H. C. Crouch, of Denver. It was discussed by Drs. Dorland, Sewall, Harrison and Davis.

The following resolution was offered by Dr. John Hall, and unanimously carried:

"WHEREAS, It is learned that the New York Life Insurance Company has decided to cut the customary examination fee from $5 to $3; and

"WHEREAS, We believe that for work requiring so much skill and time, and involving so much responsibility, the present fee is no more than a just one; therefore, be it

"*Resolved*, By the Colorado State Medical Society, that, in the name of all reputable physicians, we protest against this reduction, and wish to place on record our belief that no physician can afford to assume the responsibility of this work at the proposed figures.

"*Resolved*, That we will give our united efforts to the support of those companies who appreciate honest and conscientious medical examiners, and reward them accordingly.

"*Resolved*, That a copy of these resolutions be sent to the New York Life Insurance Company, and all reputable life insurance companies."

The Committee on Sanitation and Preventive Medicine reported, through Dr. Henry Sewall, as follows:

"The report of the Committee on Sanitation and Preventive Medicine consists of an inquiry into the condition of tubercu losis in Colorado. The history of other countries and communities where consumptive patients have gathered in order to obtain the benefits of a favorable climate, has shown that the climate so beneficial to imported cases of phthisis does not save its own natives from contracting the disease when exposed to it. The sanitary history of Italy within the last century offers striking proof of this statement. The enormous number of tuberculous patients immigrating to Colorado, most of whom, when possible, take up their abode in cities, certainly offers those conditions of contagion which would, under ordinary circumstances, at least, prove amply sufficient to account for a very large proportion of cases of indigenous phthisis.

"There is a prevailing idea, even among the medical profession, that cases of consumption contracted in Colorado, either in city or country, form rare exceptions, and almost take rank as pathological curiosities. The following statements will show that, wherever statistics have been presented having the earmarks of careful investigation, there we usually find evidences of a sensible proportion of phthisis of home-production, contracted, if you please, from imported cases, but still developed here. In Denver, where the statistical information is most full and accurate, the facts show that consumption contracted in Colorado, and particularly in the city of Denver, already forms a very important factor in the death-roll; indeed, the available statistics probably far undervalue the proportion of phthisis having its origin in our midst.

"To deny at this day the infectiousness of tuberculosis almost convicts one of pedantry. The infant mortality of Denver cannot be accounted for by the operation of the ordinary acute diseases of childhood, and the conditions of infection by the tubercular organism to which this class of the population is subjected, may well cause anxiety. The suspicion is not strained that only a vigorous campaign of prophylaxis will be sufficient to ward off the plague that has appeared upon the horizon. The State Board of Health of Colorado has set itself the task of pointing out, and, as far as possible, providing the means of protecting the people against communicable diseases. Through the facilities furnished by this Board it was sought to obtain data concerning the status of tuberculosis in Colorado. To this end, 400 circular letters, and an equal number of blank forms, were sent to physicians in every part of the State, including all the members of this Society, and all the local health officers connected with the State Board of Health. The circular letter explained the object of the committee to be the collection of reliable data on the development of tuberculosis in Colorado, and the blanks were adapted for the report of a pertinent series of facts as to the total number of deaths, the number of deaths from phthisis, as well as the number of cases contracted in Colorado for a number of years. Following are copies of the circular and blank referred to:

STATE BOARD OF HEALTH,

OFFICE OF SECRETARY.

DENVER, May 1, 1895.

DEAR SIR:

It is desired to make a collection of vital statistics regarding the history of the disease known as Consumption, Phthisis or Tuberculosis in Colorado. This summary is for purely scientific purposes, and its value will depend upon the accuracy as well as the fullness of its statements. It is proposed to publish the data in the annual report of the State Board of Health over the names of the various contributors. The matter will also furnish the basis of a report to the State Medical Society in June, and to the American Public Health Association at its meeting in Denver in October of the present year. You will contribute to the development of scientific medicine by aiding in this compilation, and to that end you are asked to immediately consult the official records of vital statistics available to you; either those in the office of the county clerk, or those of the clerk of the town or city in which you live.

Finally, a condensed statement of the history of Tuberculosis, especially regarding the influences associated with its contraction in Colorado, as deduced from your own experience, will be considered a valuable contribution. A blank form is herewith furnished you on which to make the report. All returns should be made before June 1.

Fraternally yours,

23 Eighteenth Avenue,
Denver, Colo.

HENRY SEWALL,
Secretary State Board of Health.

STATE BOARD
OF HEALTH.

TUBERCULOSIS IN COLORADO.

Name of County, Town or City,.... Name of Observer,....

YEAR,	1894—1875.
Estimated Population,	(Space for each year.)
Total No. of Deaths,	
No. of Deaths from Consumption, Phthisis or Tuberculosis,	
No. of Deaths from Consumption contracted in Colorado,	
Total No. of Cases of Consumption contracted in Colorado,	
No. of Cases in which the disease has been arrested,	
Remarks on the Causes leading to the development of Consumption in Colorado,	

Please return to Secretary of the State Board of Health, No. 23 Eighteenth Avenue, Denver, Colo.

"To these four hundred sets of questions but thirty-nine replies were received, only six of which were from Denver physicians. Many of these replies bore evidence of laborious research on the part of the correspondents to whom your committee would here make grateful acknowledgement.

"One object of these communications was gained when it was determined that, outside of the city of Denver, absolutely no official records of deaths and births had been made prior to June, 1891, and then in but one place, Pueblo. It would certainly be a worthy object for this Society to use its influence in impressing upon physicians throughout the State their duty to file with the proper civil authorities a complete record of deaths and births occurring under their supervision. In Pueblo the official records date only from June, 1891, in Colorado Springs from 1894. In Leadville, Canon City, Trinidad, Fort Collins, Greeley, not to speak of smaller towns, no records at all have been kept, or kept only in a most perfunctory manner. The official records, as far as obtainable, and the information kindly furnished by correspondents from their individual experience, may be briefly summarized as follows: No cases of consumption contracted in Colorado are reported from Canon City, Colorado Springs (1894), Leadville, Pueblo, Greeley, Idaho Springs, Littleton, Manitou, Breckenridge, Buena Vista, Eaton, Gold Hill, Longmont, Wray and Yuma.

"The negative evidence herein afforded may be considered as of very doubtful value in determining the absence of tuberculosis generated in this State. On the other hand, cases of consumption contracted in Colorado have been reported as follows:

"TRINIDAD—Dr. G. W. Robinson found four cases, all fatal, in twelve years; contagion traced in two.

"FORT COLLINS—Dr. P. J. McHugh, four cases, three fatal in three and one-half years.

"GARDINER—Dr. Mitchell reports one case.

"SAGUACHE—Dr. J. T. Melvin, eight cases, three fatal, in four years; contagion traceable in all.

"SPRINGFIELD—Dr. Homesher reports one fatal case.

"STERLING—Dr. Chipman, one case, distinct contagion. Dr. J. N. Hall, one rapidly fatal case in 1887; contagion traced.

"CASTLE ROCK—Dr. Maxwell reports one case, fatal.

"DENVER—Dr. J. N. Hall reports one case in 1894, probably fatal, and four previous cases, outside the city, with one recovery. Dr. S. D. Van Meter, five cases, all fatal, all born in Colorado, in five years. Dr. W. L. Freeman, one case in two years. Dr. R. Levy, five cases, all fatal, three in the past year.

"For the counties of Arapahoe, Bent and Cheyenne the reports show that no official records have been kept.

"The following correspondence and statistical facts represent the part taken by the Denver Bureau of Health in this investigation:

'CITY OF DENVER, BUREAU OF HEALTH, June 6th, 1895.
'Dr. Henry Sewall, Secretary State Board of Health

'DEAR SIR:—Enclosed you will find the statistics in regard to tuberculosis in the city of Denver during the years 1893 and 1894, as collated by Medical Inspector, P. E. Spratlin. He will give you explanations in regard to any matters bearing on the report and not specifically stated. He is at your service if you desire him to make any further investigation at this time. Very respectfully,

WM. P. MUNN,
'(Enclosures.) Health Commissioner.'

BUREAU OF HEALTH CITY OF DENVER, June 6th, 1895.
'Dr. Wm. P. Munn, Health Commissioner City of Denver.

'The following statistics relative to the deaths from tuberculosis occurring in Denver and its immediate suburbs are compiled from the death certificates registered at the Health Department of the city for the years 1893 and 1894. "Tuberculosis' is used in its broadest sense. There is no evidence that microscopical examinations were often resorted to for diagnostic purposes. The primary and secondary causes assigned as causes of deaths are used discriminatively in the compiling of these statistics. In several instances, where the Health Bureau was in doubt as to the correct place in the statistics for deaths, the certificates were referred to the attending physician, who decided just where the proper place should be. The hospitals and the coroner's office reported a greater number of deaths from tuberculosis, "not stated where contracted." The most satisfactory hospital record was that of the County Hospital. * * *

'P. E. SPRATLIN, M. D.,
'Medical Inspector.' "

CONSUMPTION CONTRACTED IN COLORADO.

FROM STATISTICS REGISTERED AT THE DENVER HEALTH OFFICE FOR THE YEARS 1893, 1894.

Years.	Population of Denver.	Total No. of Deaths from Tuberculosis.	No. Not Contracted in Colorado.	Place Where Contracted Not Specified.	Cases Specified As Contracted in Colo.	No. Deaths from All Diseases.
1893	125,000	435	273	113	49	1,734
1894	116,000	377	266	60	51	1,670
Total for two years.....		812	539	173	100	3,404

Average annual death rate per 1,000 from all causes, 12.89+.

The number of deaths from consumption contracted in Colorado, 0.37. per 1,000 per annum of the population. Contracted in Colorado forms, 2.9 per cent. of the total number of deaths; 12.0 per cent. of all deaths from tuberculosis.

Deducting 19 deaths from tubercular meningitis in children under 7 years of age, the deaths from indigenous consumption form 10 per cent of all deaths from tuberculosis.

Deducting 26 deaths (all children under 7 years of age), the deaths from indigenous consumption form 9 per cent. of all deaths from tuberculosis.

Deaths from consumption contracted in Colorado classified as to ages of patients and variety of disease for 1893 and 1894, as follows:

Age in Years.	Pulmonary.	Intestinal.	Osseous.	Laryngeal.	Meningeal.	Acute Miliary.
Under 1	1				5	
2	2	1			7	
3					3	
4-6	1	1			4	1
7-15	1		1			
16-20	4	1				
21-24	8				1	
25-29	6					
30-35	12			1		
36-40	10				1	
41-45	10					
46-50	5				1	
51-70	10					
Not given	2					
Total	72	3	1	1	22	1-100

Dr. H. W. McLauthlin, of Denver, read a paper entitled, "Report of Medical Cases."

It was moved and unanimously carried that the American Neurological Association be extended an invitation by this Society to meet in Denver in June, 1897, and that the Secretary be instructed to extend the invitation.

"Vomiting of Pregnancy, and its Treatment," was the title of a paper read by Dr. P. J. McHugh, of Fort Collins. It was discussed by Drs. Stuver, Harrison, Taylor, Burns, Carl Johnson and Stover.

Dr. T. M. Burns, of Denver, presented a paper entitled, "Abdominoscopy in Obstetrics."

It was followed by a paper entitled, "The Management of Retained Placenta," by Dr. G. H. Stover, of Eaton.

"Symphysiotomy," was the subject of a paper next read by Dr. T. E. Taylor, of Denver.

It was discussed by Drs. Burns, Parkhill and J. M. Perkins.

The morning session was then adjourned.

Afternoon Session.

The Society was convened at 2 o'clock by Vice-President E. Stuver.

The first paper of the afternoon was read by Dr. Sol. G. Kahn, of Leadville. It was entitled, "Inflammation of the Uterine Appendages."

It was then moved and carried that this paper be discussed after the reading of the next paper on the same subject.

Dr. T. A. Stoddard, of Pueblo, read this paper. It was entitled, "Diseases of the Uterine Appendages."

The papers were discussed by Doctors Harrison and Lee Kahn, who presented a new uterine applicator, and exhibited the instrument. Dr. Stoddard closed the discussion on the papers.

"The Management of Pelvic Suppuration in Women," was the subject considered by Dr. W. A Jayne, of Denver. It was discussed by Dr. I. B. Perkins.

Dr. Loni Weiss, of Del Norte, exhibited a photograph of

a powder-burn case in which by the use of peroxid of hydrogen he had been able to remove the unsightly scars.

"Hysterectomy," was the title of a paper read by Dr. I. B. Perkins, of Denver. A number of pathological specimens were shown to illustrate the text.

The President called for discussion concerning the American Public Health Association.

Dr. Henry Sewall made the following remarks :

"Among the most significant things that have marked the meetings of this Society, the interest shown in preventive medicine is the most significant. I think that every one must realize that Colorado must do something in the way of making real and practical what we know of preventive medicine. Organization is absolutely essential to the carrying out of any such plan as this, and this fall we will have an opportunity of perfecting a State organization and of entering into close communion with an international Organization to further our own good. From the 1st to the 4th of October, the American Public Health Association meets in Denver by invitation. This Association embraces over 1500 members, including all the professional sanitarians of Mexico, Canada and the United States. About a dozen physicians in Colorado belong to its ranks. It is desired very heartily by the officials of that Association that its membership here be largely increased through the addition of people living in this State. It is hoped that at least 500 physicians in Colorado will join the ranks of this Association.

Dr. W. P. Munn followed by saying :

"What does the meeting of the American Public Health Association mean to Colorado ? It means to gather within the limits of our State all of those men on the North American continent who have taken enough interest in matters of public health to make it a life study. It means to stir up a public sentiment in reference to matters of public health which will permeate not Denver alone but every community of whatever size throughout this State. It means the awakening of a sentiment which will advance public health interests and sanitary interests throughout the whole Western region. It means, in addition an education of the delegates. They are men

of influence through the East, and the knowledge which they will gain of the climatic resources of Colorado means the bringing into this State, not of hundreds of thousands of dollars, but of millions of dollars, which will be invested here, and which will redound to the prosperity and advantage of Denver, and of this whole State, and of every man in it. Therefore, it seems to me that we should all of us constitute ourselves missionaries of this cause, and do all that we can by act, or a little money or service, to the success of this convention, to the spreading of knowledge of it, and to the raising of the fund for the entertainment of the delegates."

President Hubert Work read his address.

It was then moved and carried that the address be referred to the Publication Committee; that the thanks of the Society be tendered him for it, and that the gavel which he has used so skilfully during the present meeting be presented to him as a memento.

Dr. John Hall suggested that the incoming Publication Committee be instructed to publish the likenesses of the former Presidents of this Society in the forthcoming volume of "Transactions." It was moved and carried that the Committee be so instructed.

It was moved that, in accordance with the suggestion of the President, the *Colorado Climatologist* be made the official organ of this Society.

The following amendment was offered: "And that the authors of papers be permitted to print and publish them wherever they wish." The motion, as amended, was carried.

The Committee on Necrology, through Dr. E. J. A. Rogers, reported the death of three members:

Dr. Charles M. Reed, of Leadville, a graduate of the University of Louisville, and a member of this Society for one year, died at Dotsero, Colorado, September 29, 1894, of pulmonary tuberculosis, at the age of 24 years.

Dr. D. J. Scully, of Aspen, a graduate of McGill University in 1887, and a member of this Society for two years, died at Lindsay, Ontario, April 21, 1895, of pulmonary tuberculosis.

The following obituary notice appeared in a local Canada paper regarding the late Dr. D. J. Scully:

"About noon yesterday Mr. Daniel J. Scully died at the residence of his mother, on Glenelg street. This event, painful as it was to his many friends, was not unexpected, as he had been suffering from serious diseases of the lungs for many years, added to which was a complication of hip-joint disease, which showed its appearance about five years ago. Since the end of May last the deceased was confined to his bed, and during that time passed through an illness which was marked with unusual and distressing suffering. Armed, however, with a fortitude that nothing could depress, and a patience that never seemed to be exhausted, he bore his sufferings with admirable and well-sustained resignation. No vain words of complaint, no murmuring against his lot, fell from his lips during his long illness, but a practical and sincere religious nature sweetened the bitterness of his trials, and buoyed him up with a hope for better things in the world to come. Dr. Scully was the second child and eldest son of the late Jeremiah Scully, and was born in the township of Emily, in October, 1862. His parents shortly afterwards removed to Lindsay, where the deceased made his early studies, first as a pupil of the Separate School, and afterwards at the Collegiate Institute. The distinguished ability he always displayed became evident in his early school days, and in his examinations at Lindsay he always stood in the highest rank. After the preparatory model school training, he entered the teaching profession, and acted as principal of the Brockville R. C. Separate School for a few years. Ambitious to enter the medical profession, he attended the prescribed course of studies at McGill University, Montreal, and graduated from thence in 1887, after a very brilliant career. He began the practice of medicine in Chicago, but shortly removed to La Crosse, Wisconsin, from which place with failing health he went to Colorado. Here he resided until fifteen months ago, when he returned to Canada for a period of rest from his disease, which, however, he was not destined to obtain. In his Western home he was widely respected for the uprightness of his character and the excellence of his professional skill. Had Doctor Scully

lived, his name would have become eminent in the domain of surgery, for which branch of science he had special qualifications and taste. Doctor Scully was well known in Lindsay, where he was a general favorite as a schoolboy, and as one of the most prominent young men of his day in athletic circles. Those who met him in the last year had nothing but pity for the gifted young man, striken down in the prime of his manhood, for whom neither science nor the tender care of loving, untiring nurses possessed any relief beyond that of the passing hour. Doctor Scully leaves his wife and one child to lament his early death."

Dr. J. W. Powers, of Idaho Springs, a graduate of the Rush Medical College in 1885, and a member of this Society for three years, died at Salt Lake City, Utah, March 25, 1895, from the effects of a severe attack of pneumonia by which he was prostrated in Iowa some years ago.

Dr. Joseph W. Powers was born in Iowa in 1858. Graduated at Rush Medical College, Chicago, in 1885. Began practice at Hudson, Black Hawk County, Iowa, in 1886. Was for some time Secretary of the Black Hawk County, Iowa, Medical Society and was elected President of that society in 1890. Had a severe attack of pneumonia in 1887 and never recovered from effects of the same. Was compelled to leave Iowa on account of poor health and removed to Idaho Springs, Colorado, in 1890. Remained at Idaho Springs in practice until March, 1894, when he was obliged to give up practice owing to failing health. He came to Salt Lake City in March, 1894, where he died on March 25, 1895. He was never married.

The Committee on By-Laws stated through its Chairman, Dr. Clayton Parkhill, that it had no changes to suggest.

Dr. S. A. Fisk reported that no paper had been submitted to the Committee of Award for the one-hundred-dollar ($100) prize offered by the Society for the best paper on, "The Diagnosis of Tuberculosis by Microscopical Examination of the Blood."

It was moved and carried that the thanks of the Society be tendered the proprietors of the Windsor Hotel for their many courtesies; to the druggists and instrument dealers making dis-

plays, and to Mr. J. P. Flynn, of the Colorado-Utah Traffic Agency, for the special railroad rate made to members of the Society.

It was moved and carried that the Society tender its thanks to the Executive Committee, and especially to Dr. Robert Levy, for the success of the present meeting.

The Committee on Admissions, through its Chairman, Dr. John Hall, reported favorably upon the applications of the following proposed members:

Sarah J. Fearing, Lyman M. Ellis, George McKinzie, A. G. Mays, Edward Jackson, W. M. Cummings, V. R. Pennock, Charles A. Powers, Leonard Freeman, W. T. Liggett, Will Moore, J. A. Whiting, William L. Bruner, F. M. Collier, Thomas J. Stiver, Lillian Heath, Thomas G. Maghee, H. W. Rover, J. E. Johnson, Ralph L. Taylor, W. H. Davis, Alexander M. Cheney, E. F. Lake, A. H. Sawins, Lewis B. Brasher, Josephine L. Peavey, Elizabeth E. Brown, John W. Smith, Frank N. Carrier, Josephine Milligan, B. F. Stockett, W. E. Shotwell, W. A. Calhoun, E. C. Hill, J. M. Blaine, B. L. Jefferson, H. Grant Sigman, T. J. Williams, Charles Wright, S. H. Meuer, F. A. E. Disney, J. L. Fierstone, Annie W. Williams, John T. Beatty, A. E. Spratlin, T. J. Carlin, Edward Delehanty, D. H. Ludlow, J. W. Purcell, J. E. Beebe, W. H. Buchtel, H. Mager, S. W. Miller, R. T. Gillmore, F. E. Warren, O. P. Shippey, A. D. McArthur, Charles Jaeger, Alicia F. Jeffery, J. W. McDaniel, Daniel Neuman, W. Bedell.

The Chair appointed Drs. Bull and Munn tellers to collect the ballot for the election of the above proposed members.

It was moved that the incoming President be instructed to appoint a committee of fifteen to confer with the American Public Health Association at its meeting here in October, regarding the establishment of National Sanitariums. Carried.

It was moved and carried that the vote making the *Colorado Climatologist* the official organ of the Society be reconsidered.

The tellers for the collection of the ballot cast for membership, reported that ninety-nine ballots had been cast and that all of those proposed had been elected.

It was moved and carried that the vote concerning the *Colorado Climatologist* be taken by ballot. This resulted in a vote of sixty-three for and eighty-four against making it the official organ of the Society.

The Nomination Committee appointed by the Society reported through Dr. John M. Foster as follows:

"We, your Committee, beg leave to report the following nominations:

For President.

Dr. I. B. Perkins, of Denver.
Dr. Robert Levy, of Denver.
Dr. J. N. Hall, of Denver.

For First Vice-President.

Dr. A. J. Robinson, of Aspen.
Dr. T. A. Stoddard, of Pueblo.

For Second Vice President.

Dr. Lee Kahn, of Leadville.

For Third Vice-President.

Dr. Mary Ambrook, of Boulder.

For Corresponding Secretary.

Dr. E. R. Axtell, of Denver.
Dr. C. K. Fleming, of Denver.
Dr. T. M. Burns, of Denver.

For Recording Secretary.

Dr. Laura Liebhardt, of Denver.
Dr. M. H. Mack, of Denver.
Dr. Edward Jackson, of Denver.

For Assistant Recording Secretary.

Dr. H. H. Bucknum, of Denver.

For Treasurer.

Dr. W. F. McClelland, of Denver.

For Board of Trustees.

Dr. H. A. Lemen, of Denver.
Dr. Jacob Reed, Jr., of Colorado Springs.
Dr. S. A. Fisk, of Denver.

Dr. W. R. Whitehead, of Denver.
Dr. A. Stedman, of Denver.
Dr. L. E. Lemen, of Denver.
Dr. W. E. Wilson, of Denver.

For Committee on Admissions.

Dr. T. A. Hughes, of Denver.
Dr. Maurice A. Walker, of Denver.
Dr. P. F. Gildea, of Colorado Springs.
Dr. P. J. McHugh, of Fort Collins.

It was moved that the Secretary be instructed to cast a ballot for those nominated by the committee for the offices of Second and Third Vice-Presidents, for Assistant Recording Secretary, for Treasurer, for Board of Trustees and for Committee on Admissions. Carried.

The Society then proceeded to the election of President, of First Vice-President, of Corresponding and Recording Secretaries. On the first ballot there was no election of President, but Dr. A. J. Robinson, of Aspen, was chosen First Vice-President; Dr. E. R. Axtell, of Denver, Corresponding Secretary and Dr. Laura Liebhardt, of Denver, Recording Secretary.

On the third ballot for President, Dr. I. B. Perkins, of Denver, was chosen by a majority of seven. He was declared duly elected and was escorted to the chair by Doctors Levy and Hall.

After appropriate remarks by the new President it was moved and carried that the Twenty-fifth Annual Session of the Colorado State Medical Society stand adjourned.

LAURA L. LIEBHARDT, M. D.,
Recording Secretary.

PRESIDENT'S ADDRESS.

DR. HUBERT WORK, PUEBLO, COLORADO.

Members of the Colorado State Medical Society:

We are about to close our Twenty-fifth Annual Convention.

The work of this session represents the medical achievements of a quarter-century in a new State, and it should be a source of mutual congratulation that the papers discussed have been as progressive and scientific as those read before similar societies whose membership is derived from a country tributary to the old medical centers of the Eastern States.

Only those of you who have been members of this Society since its birth, or who have had access to its early "Transactions," are able to appreciate its progress as a medical organization.

The characteristics of the different papers read at its annual meetings clearly disclose the advancing steps of medicine during the period covered.

This session, completing as it does our first twenty-five years of organized existence, you will be willing to retrospect a little. After all, the history of that which has been accomplished is but a history of men.

Of the sixteen physicians who in 1871 signed the resolution creating a Territorial Medical Society, broke the ground and laid the corner-stone of our present organization; but five are at present on our rolls of membership. Some have passed over the mountain range to western fields, and some have crossed the border of the undiscovered country. The much-loved Steele, announcement of whose going personally bereaved his every acquaintance; McMurtrie, the studious son of a distinguished father; Buckingham, to whom fell the honor of being your first presiding officer; Thacker, whose failing health compelled his resignation from that office; Williams, a man for

whom the poor wept when he died; and the immortal Davis, whose strong heart did not decline with years, but rode it out with him through life and death.

These, our one time Presidents, we no longer see. As they preceded us in this medical field, they have gone on before in the journey to the mystic plains of the hereafter.

Displeasing as personal mention is to the worthy living, I cannot but express the Society's respect for those charter members who still meet with us. Bancroft, Stedman, McClelland, Elsner and Edmundson alone remain to represent the founders of Colorado's Medical Society.

For a quarter-century these men have kept abreast, often in advance, of the strides of medicine, until they stand to-day as easily our fathers in the profession as they are in years. Each name a tower of strength, in medicine, in the community and in the State.

Let no one of our members, youthfully self-confident, disparage the Colorado physician of twenty-five years ago. "There were giants in those days, and their good works live after them."

During its second decade and a half the Society was represented through its Presidents by the scholarly Anderson, of Southern birth; the gifted Thombs, for half a generation the trusted custodian of the State's insane, and whose military record is written history; the brilliant Lemen, and the versatile Hawes, a boy soldier, then a medical student, and ever since a student of medicine; by Fisk and Solly, whose studies on phthisis have won for them international reputation; and by Graham, Wilson, Collins and Rogers, the selection of whom was less an honor conferred than a dignity received; and by Eskridge, that distinguished master of mental intricacies; and by Strickler, for whom life's evening shadows have been prematurely lengthened, and his journey down the western slope darkened, suggesting this paraphrase of the divine apostrophe: "Greater devotion hath no man than this, that he imperil his life for the suffering."

With mental portraits of such men as those hung in the galleries of memory, the present advancement of our organiza-

tion is explained, and a stimulus provided for future achievements.

Since this Society held its first meeting, its members have seen the revolution of medical science. It has been divided and sub-divided into many branches and specialties.

Doubtless that branch which contemplates the treatment of the diseases to which women only are subject, has made the most rapid advancement.

But seven American colleges had at that time established chairs for the exclusive teaching of this branch, and it is less than twenty years since the American Gynecological Society was organized, the reports of which constitute a history of medical and surgical progress greater than ever before published. The surgical procedures now so common for the relief of afflicted women have mostly been devised and perfected in technique since then, and the names of those pioneer teachers are now everywhere revered. While that great teacher of the wise, the godfather of gynecology, whose very memory is a legacy—trustful as a child and gentle as a mother—has also passed for the last time from the amphitheater, leaving behind him a record of good works, and the name of Sims made immortal.

It is no longer necessary that the sensitive woman be distressed by necessary treatment from those of the opposite sex, for with the development of her necessities came her educated sister, by whom the timid wife may be counseled when the fears of approaching maternity weigh upon her; and under whose guidance the school-girl's strength may be conserved, and that instinctive delicacy, the chief charm of young womanhood, remain unblushing.

It can be said of general surgery that it has kept equal pace, since operative gynecology is but a branch of it. It has successfully invaded the brain and spinal cord, resected the spinal column, recognized and removed the suppurating appendix, seeks to relieve the compressed brain of the congenital defective, enables the rachitic mother to bear living children, and educates aright the spinal column of the incipient hunchback.

It is the pride of this Association that its membership in-

braces those who successfully execute all the advanced surgical procedures known to any country, many of which at the time this Society was conceived were believed impossible.

The advancement in therapeutics has been a matter of experience, rather than a subject of history, with those of our charter members present. Progress in this branch has been accomplished by winnowing from the yearly harvest of new remedies sought to be introduced the few grains of value, rather than a supplanting of the tried and proven ; and by the careful search for the smallest possible dose, and the most elegant excipient.

The practical results are most encouraging. The mortalities of epidemics grow progressively lighter ; the feeble newborn now lives that a few years ago must have perished, and the average length of life is increasing.

We find on our twenty-fifth anniversary the era of preventive medicine well advanced, and all indications bear evidence of rapid increase in scientific attainments among medical men. It is reasonable to predict, from the recent history of medicine, that we are now on the verge of greater advances in our knowlege of remedial and preventive agents than ever before, because of the spirit of investigation that is abroad in the land. The recent discovery of an anti-diphtheritic, with whatever of value time may vouchsafe it, together with others of like nature, are but earnests of latent probabilities in medicine.

The elements of great successes are visible in the wrecks of great failures, and the direct outgrowth of the impetus given to experimental investigation by the announcement of Koch's tuberculin is seen in the advent of the anti-toxines, but one of the many discoveries we will probably see, the inception of which had like origin.

Apparently, that which most threatens continuous medical advancement, is the the tendency to elaborate refinements of specialism.

It is argued, and with reason, that one mind cannot comprehend all the branches of medicine or surgery, much less acquire the manual dexterity requisite for the skilful execution of the varied operations. It is true that the field of medicine

has become so broad and its practice so scientific that those who devote equal attention to all its branches can hope to contribute but little to what is already known.

But we are all made to realize the involuntary tendency of the skilled gynecologist to remove the ovaries for hysteria, and of the honest oculist to fit glasses to all children with headache. And it has not been long since a good man announced the sole cause of epilepsy to be that of nasal irritation.

These sometime errors are by no means unpardonable, but indicate that the limited field of observation open to those who restrict practice to a few organs, necessarily narrows the scope of vision to a degree impossible to surmount, if adopted as the initial step of practice.

Delicacy of the tactile sense must of necessity be preserved, and operative skill comes only through constant repetition; but the study of diseased action, if not its treatment, must be comprehensive, or a reputation for operative skill only, will depreciate the value of services rendered to the profession by those to whom we are already indebted for so much of value.

The specialist in medicine should be the result of general practice, not a part of it; the product of experience, and not created through the process of exclusion; for no organ can be sucessfully treated without a due appreciation of its associates and their relations.

It will always be true that each practitioner will develop a particular aptitude for special lines of work, and it should be encouraged; but in the prevalent tendency of students to enter college with the avowed intention of being graduated into specialists, there is a growing menace to the symmetrical development of medical science.

The multiplication of specialties has not been without excuse, but was, to an extent, a necessity arising from brief college courses and imperfect practical training; but with a higher examination for matriculates, the lengthened college course, and the extinction of cheap colleges, the limitations of specialists will be extended, and the vexed question of increasing supply of physicians over the demand will be solved as well. The annual spring-time plaint of our being overrun by newly-graduated

doctors is beneath the dignity of medical men. They should be welcomed, with the hope that they may bring new knowledge, as they surely bring new energy, among us. Our financial protection can only be that of progressively increasing knowledge, for we are subject to the same source of competition with those of every other profession or business, *i. e.*, the development of young men. The progressive physician has little to fear from him who enters the field many years in his wake, but there is no protection for him who wraps his medical talent in a napkin, and engages in subsidiary pursuits; for this generation is demanding that its physicians be scientists, and that they cure the sick.

The diagnostician is the present necessity in medicine, but there is a well-grounded fear that the exploratory incision and the post-mortem section may supplant him.

The first quarter-century of this Society's existence belongs to history, and is a most creditable record. Through its membership it has been proven that in Colorado, in common with similar mountainous regions, is found the only cure for pulmonary phthisis of established merit. We are annually confronted with one or more new cures for this disease, until we have ceased to be deceived, because we have ceased to expect that any medicinal substance has within itself the power to restore tissue broken down from inherent weakness, or which has been for the same reason unable to resist germ invasion.

The people are looking to the medical world for a cure for this disease which annually destroys one hundred thousand lives in the United States alone. They enumerate the achievements of medicine in its various branches and ask why it cannot do this thing also. That the lay world is thoroughly alive to the importance of such a discovery, is evident from the eagerness with which the first intimation of a new cure is grasped and immediately heralded as an assured fact, despite the pleadings of the investigator for more time in which to establish or disprove the value of his discoveries.

This Society has watched the appearance of these so-called specifics, eagerly studied and promptly abandoned them, until at present we know of but one remedy which has proven itself

able to cure this "white plague," and this is, the subtle influence of high altitude.

Dr. Flint, the elder, reporting, in 1875, a series of cases treated by climate, said of Colorado as a place of resort for the phthisical, that "it had not excited much attention prior to my making abstracts of histories for analytical study, and for this reason it does not appear in the foregoing lists." Comparing this statement, coming as it did from what was then our greatest authority on pulmonary diseases, with the attention our State has already attracted, and we can easily predict for Colorado a world-wide reputation within the next twenty years as a sanitorium for the tuberculous.

The discussion of this disease necessarily implies the reiteration of much that has already been said; and it may be thought a supererogation in Colorado, where we are all of one mind as to the efficacy of our climate and the general methods of its application. But the fact remains that the average Colorado physician gives less attention to the study of individual consumptives than do those who have in the atmospheric environment a menace, instead of an auxiliary to its cure. The axiom, that no remedy powerful for good but may be, if injudiciously applied, equally capable of harm, is too often unheeded, and every reliance placed upon the climate; its degree of elevation and methods of application ignored as though incapable of harm in any case.

The work lying nearest to the hand of this Society at present is the scientific study of tuberculosis. Other countries, and many medical bodies have men skilled in scientific research, and laboratories of most modern invention, for the study of this disease; but the student of no country has a curative auxiliary equal to that provided by nature for the Colorado investigator, in the atmosphere itself.

This Society, as the leading medical organization of the Rocky Mountain country, owes it as citizens to the State of its adoption that this climatic influence of Colorado in disease receive the scientific attention its value merits. We will be held accountable to the medical profession as a whole, if we fail to determine and advertise for its enlighten-

ment the possible benefits to be derived from high altitude; and we will have failed in our duty to those who *directly* rely upon us as medical advisors, if we neglect to push our investigation to that point demanded by its importance.

We will not be held responsible for the success or failure of the new operation for hypertrophied prostate, the latest manœuvre in hysterectomy, or the line of incision for the removal of the appendix, for these are capable of equal demonstration in any climate; but the discovery of a cure for consumption, certainly so far as America is concerned, should first come through a Colorado physician, because to him it will come the most easily.

At no time in the history of our Association have we been so well equipped for this research as now. The teaching force of the three medical schools of the State is comprised chiefly of those connected with us; one of our alert and scientific members has recently been appointed Health Commissioner of the State's largest city, another member, trained by years of study abroad, has been placed in charge of the laboratories of that department, and facilities for bacteriological research have been gratuitously extended to every physician of Colorado. The State Board of Health has been appointed from our membership; the recent appointments to the State Board of Examiners also; and there has been established by one of our members, since our last meeting, a periodical devoted to the study of climatology, a journal which should be made the official organ of this Society, and for the success of which each member should feel a personal responsibility.

With these engines of scientific research well in hand, the possibilities of our organization cannot be estimated.

There will be established, in the near future, at Washington, a Department of Public Health, as a branch of the National Government. Probably not at first will its chief be a cabinet officer, but, like the Department of Agriculture, a bureau in the beginning, to be eventually recognized as a Governmental Department. The functions of this bureau will doubtless be primarily that of preventive medicine for all classes; and to superintend curative provisions that may be made for the aid of the growing

class unable to procure by their own means suitable environments and treatment for chronic diseases, precisely as our cities have for years past been caring for their respectable poor, whose ability to support themselves is dependent upon the maintenance of health. This new department, if formed on lines already adopted by the Weather Bureau, will collect all available data concerning the natural and improvised health resorts of the country, and study the different climates in their relation to the cause and cure of disease.

The time has now arrived when this Society as a medical organization should formulate and bring forward the knowledge we already have, as a result of the individual experience of our members, on the climatic treatment and cure of phthisis, in appropriate form and at such times and places as will attract the interest of the sanitarians of the country, and through them compel the attention of our law makers, to the end that national sanitoria for the cure of consumption may be established in Colorado.

This recommendation would properly come within the province of the Bureau of Public Health above referred to, were it already established; but, pending the creation of these officials, and having, as we do, representatives in Congress who command the respect of the United States, and supported as they would be by Colorado enterprise and by the available data on the subject, it is entirely possible to have enacted a law specifically providing for such an internal improvement in Colorado.

This project, it may be thought, might properly come within the province of Colorado herself; but the fact that this State develops a minimum per cent. of its tuberculous population, despite the enormous ratio of children born of tuberculous parents, and also that those it is sought to benefit are from the bread-winning classes of the low-lying States, who are therefore unable to return adequate compensation for care received, precludes the propriety of the State alone assuming the care of the nation's consumptives.

It will no doubt be urged that Colorado should not be made the haven for the invalid poor of the entire country, but it

should be remembered that a large portion of our most active citizens came to the State without money capital or health, and that the exceptionally high mentality of Colorado's inhabitants is not due to the fact that her Rocky Mountains are filled with the precious minerals, so attractive to humanity in general, but because they so modify climate that life is possible, and activity becomes a pleasure to this most valuable class of citizens.

I would recommend that your incoming President be instructed to appoint a committee of fifteen members of this Society, to include those who have by individual research contributed so much of value to our present knowledge of this disease, to memorialize the Congress of the United States on this subject. The data collated and compiled by this committee would be appropriate matter to lay before the American Public Health Association, which holds its annual meeting in this city early in the coming autumn, and will justify a request for its assistance. The approval of this national body of sanitarians would be an indorsement of inestimable value in the furtherance of this project.

This Committee would be able to detail the physical characteristics of our climate, together with its physiologic and therapeutic action; the configuration of the superficies as factors in modifying and maintaining climatic conditions; the adaptability of our mountain parks, with their mountain waters and mineral springs, as sites for sanitoria. And it could furnish accurate statistical data of cures, and classify types of disease into those adapted to altitudes of varying heights, and designate the stages and complications to which high altitude is injurious.

Ten years ago it was generally held that an altitude of 5,000 feet or more was adapted to relatively few phthisical patients, and not at all to those whose cases were complicated by cardiac disease. But we now know that the fibroid and the hemorrhagic, the incipient and the chronic, those with cavities and those without; are all benefited in some degree if properly advised concerning exercise and general deportment, and a liberal per cent. cured at altitudes of 4,000 to 10,000 feet.

Only those valvular cardiac diseases which are not compen-

sated, or where there is serious degeneration of the heart's walls, are injured by an elevation of 5,000 feet. Functional disturbances are not exaggerated, and that form of disease in which hypertrophy of the right side is associated with emphysema, asthma or chronic bronchitis, is distinctly benefited by altitude treatment. These instances are mentioned simply to illustrate errors which have been and still are prevalent among the medical men of the country, and which can only be successfully controverted by the weight of authority represented jointly by our medical teachers.

Sanitoria for the purpose under consideration should be located at two or three places in the State, representing different degrees of altitude, from which the patients could be graduated from the lowest to the one next higher in point of elevation, as the curative process progressed. The buildings should be small cottages, thus securing economy of construction, and allowing indefinite multiplication; the segregation of the sick, and providing for that desirable privacy of individuals suggestive of home life and conducive to contentment of mind.

Our study of this vital subject is sufficiently advanced and scientific in its results, and contains sufficient of hope and promise to justify our request for governmental assistance in the application of climatic therapeusis under some more elaborate system than is possible under private or municipal organization.

Ladies and gentlemen, the office with which you one year ago entrusted me, I now return to you; and in so doing, I wish to assure you of my high appreciation. No one can be the President of this association of medical men and women, without being keenly sensible of his own imperfections, and without realizing that he occupies the position of greatest honor within the gift of his fellow-physicians.

For the active and intelligent co-operation of your committees, and for your cheerful assistance and kindly forbearance, I thank you.

RELATIONSHIP BETWEEN DISEASES OF THE EYE AND BRAIN.

ROBERT FIELDS LE MOND, A. M., M. D., DENVER, COLO.

The intimate association, physiologically and pathologically, of the eye and the brain has been overlooked to a very great extent by nearly all writers on ophthalmology, and, to a less degree, by the authors of works on diseases of the brain and nervous system. Reasoning from the close nervous connection existing between eye and brain, we are at once impressed with the clinical importance of the interdependence of these two wonderfully sensitive organs. In the course of a somewhat extensive ophthalmic practice during the past few years, I have met with a considerable number of cases which, to my mind, demonstrated vividly that this relationship should be better understood. A desire to acquire a clearer understanding of the subject myself, and possibly to bring out a discussion, was the incentive which prompted me to write this paper.

Even as late as 1859, the great ophthalmologist and scientist, Donders, who was then at his zenith in the development of optics as regards the laws of refraction and accommodation, brought to light a term thitherto unknown in its real significance—astigmatism; a word whose meaning our school children are now being taught. When this condition, astigmatism, is present only to a limited degree, it may cause what has been called for ages supra-orbital neuralgia. Viewing the matter just in a cursory way, do we understand how this pain is produced? Astigmatism, simply defined, is a congenital deformity, a lack of symmetry in the form of the eye-ball. Do we mean to say, regarding the pain in this region, that the eye itself is in pain? By no means. The eye is in a fair state of health, with total absence of any inflammatory condition. We must say, then, that there has been communicated to the brain, the great mother of the nervous system, the fact that her dearest child is unable to do good work in refracting rays of light upon the fundus oculi, and this good mother is in distress on account of her child's deformity. But when the astigmatism is of a severe and

complicated type, there results an inflammatory condition, which causes decided disturbance of the functions of the eye regarding sight. For instance, if the highly astigmatic eye cannot abstain from trying to perform labor for which it is not adapted, and which is so severe in its effects on its mother, the brain, she must of necessity resort to some means by which the eye shall be given rest. Thus, an inflammatory condition is set up by the brain withdrawing her power of vital resistance, and the impending forces at once attack this eye, and it becomes congested, not only in its ocular and palpebral surfaces, but the deeper recesses and the essential mechanism of the organ, such as the ciliary process and the retina, are involved. Then the orbicularis muscle is commanded to shut off the light from the inflamed eye, and by these means the organ of vision is put in a comparative state of rest. Do we understand that the case portrayed is solely and distinctively an eye trouble? We do not; its cause originated at a given point, and, like a telegraphic message, word has been sent to the brain that the eye was in trouble; and, after deliberating over this complicated condition, the brain decided it was best to take the course described. By this assault upon the structures of the eye, supra-orbital neuralgia is relieved or prevented, and the inflammatory condition of the organ on the outside of the brain has been placed in its stead; by this means the seat of power has been protected, and one of her branches, only, suffers. How interesting it is to reason on these conditions, and to learn how nature protects her interests at every conceivable point, thereby preserving her pristine vitality. The beautiful provision of nature in the case stated, is this: while the eyes only are impaired, the other parts of the system may be in good working order, performing all their functions without difficulty. But if the central irritation should have been continued, an inflammatory state of the seat of the nervous system would certainly have resulted; and this, possibly, might have terminated in a degenerative process, to whose deadly influence, sooner or later, the brain would have been forced to succumb.

Optic Neuritis is another well-defined disease of the eye, which, in a vast majority of instances, points directly to brain

complication. If a patient is suffering with continuous headache in optic neuritis it is always indicative of serious disease, and if you can exclude three constitutional disorders, namely, anaemia, kidney disease, and lead poisoning, and if, moreover, the headache is accompanied by vomiting, there is scarcely one chance in a hundred to fail in a diagnosis of a central lesion, most probably tumor. The ophthalmoscope should never be neglected in cases of severe headache; it often leads us directly to a diagnosis.

Some time ago a lady was brought to me suffering from a continuous headache, which had been a source of annoyance for several months. Her vision was very much impaired; she read 3-200 with one eye, and 2-200 with the other. Her vision had been failing continuously for six months. When I examined her with the ophthalmoscope, I found a well-defined case of optic neuritis, the opacity of the disk being dense and striated. The only symptom which she had shown indicating disease prior to this eye trouble, was a slight unsteadiness of gait, from which she claimed she had long since recovered. I suspected a central brain lesion, and so informed her attendant. I discouraged any treatment so far as the eye affection was concerned. She returned to her family physician. About a month later I was informed that she had succumbed to the disease, and that a post-mortem showed a central brain tumor.

Optic Atrophy, when not a sequel of neuritis, is generally a symptom of degenerative disease of the central nervous system. To undertake to classify all the different forms of atrophy is not necessary on this occasion; neither is it satisfactory, for there are so many exceptions that the rule is nullified in many cases. So, for convenience, and to save time, I will merely mention the progressive forms, as being especially destructive, whether from multiple sclerosis, locomotor ataxy, syphilis, or embolism of the central artery. Atrophy from pressure of a tumor on the nerve is comparatively uncommon, as only a small proportion of the intra-cranial tumors are situated in this vicinity. Hemorrhage by compression, exostosis, cheesy tubercular masses, neoplasms, and hydro-cephalus internus are all quite common causes of atrophy by pressure upon the

chiasm. In all cases of early atrophic disease of the nerve, it is well to measure the amount of vision, and ascertain if any great error of refraction is present. We invariably have diminution of color perception, and a contracted field. In order to determine whether there is really disease of the optic nerve, or whether it is a central brain lesion, just observe the following rule: the reaction of the pupil to light is lessened in diseases of the nerve, but not in diseases of the brain.

Inequality of Pupils, unless it has been present from childhood, is nearly always indicative of a lesion of some character along the optic tract. When not due to this cause, it possibly has been brought about by paralysis of a branch of the third nerve, following a long siege of sickness—typhoid fever, scarlet fever, diphtheria and whooping cough all predisposing to this condition. If the pupillary ineqality cannot be traced to one of these causes, it is a good idea to seek for intra-cranial complications; and don't forget, in cases of this kind, to test for color blindness, and to measure the visual field, as we often have small spaces, like little scotomata, producing a break in the field of vision, as well as deterioration of color perception.

Aneurism.—We sometimes find optic neuritis appearing in this affection, but it is not usual unless the aneurism is near the optic nerve; for instance, in the internal carotid or anterior cerebral artery. Total loss of sight of one eye, which, after a time, extends to the other, causing complete blindness, often occurs without the slightest ocular disturbance, save the constant failure of sight. In the beginning of a disturbance like this, we frequently have a symptom known as hemianopsia, a permanent defect of half the visual field of both eyes from pressure on the tract, or chiasm; and sometimes from a functional disturbance of the optic centers in one cerebral hemisphere. The hemianopsia is usually either mono-lateral or bi-lateral, the latter variety affecting the external half of one field and the internal half of the other; the former the temporal or nasal half of each eye. Bi-nasal hemianopsia can exist only as a symmetrical disease of both optic nerves, pressure upon external part of each nerve. Bi-temporal hemianopsia, loss of the outer half of each field of vision, always means damage to the internal half of each

nerve in front of the chiasm, and this would necessarily injure the fibers of each nasal half of the retina. The complete loss of one eye functionally, and the other left undisturbed, signifies derangement of the nerve between the chiasm and the external part of the optic foramen. I think I have mentioned all the principal regional points which are requisite to properly understand the several forms of lack of visual acuity due to lesions along the optic tracts. In hemianopsia, the color sense is usually found to be perfect in the unaffected half of the visual field. Paralysis of the third nerve, without impairment of sight, is generally produced by aneurism of the posterior cerebral and communicating arteries.

For want of time, many diseases have been omitted which have more or less bearing upon this rare field. I have tried to discuss those only which are complicated the most often with brain trouble. Concussion, compression and laceration of the brain involve the eye often-times, and in many instances the *ophthalmoscope especially*, and the perimeter, aid very materially in arriving at a correct and satisfactory diagnosis as to the graveness of the injury.

I have endeavored to give the best solution of this subject possible in the short space of time which has been allotted to me.

DISCUSSION.

DR. PERSHING: I think there is no doubt that the importance of eye symptoms as a means of recognizing disease elsewhere than in the eye is by no means sufficiently recognized by the profession at large. I must claim, however, for the neurologists that they are generally keenly alert as to the occurrence of eye symptoms. They must be so, because a symptom occurring in the eye very often shows that organic disease is to be dealt with, rather than a mere functional disturbance. For example, an inequality of the pupils or their failure to properly react the light, will often show that the disease is paretic dementia rather than neurasthenia. Again, such symptoms, under different circumstances, will show that locomotor ataxia is the affection to be dealt with rather than a functional disturbance. Doctor LeMond has spoken of the great significance of optic

neuritis in certain cases of headache. Not long ago I saw a case with Doctor Stedman and Doctor Blickensderfer, in which headaches had persisted for three years, but only within the past few weeks had become of alarming severity. In that case, proper examination of the eye showed a distinct double optic neuritis, and, as Doctor LeMond says, lead poisoning, uræmia and pernicious anæmia having been excluded, the diagnosis of tumor was made certain. A thorough examination of the eyes must never be omitted in such cases. On the other hand, Mr. President, I feel like claiming that the oculists should pay attention to a few neurological symptoms that are of importance, particularly to any changes in the knee-jerk, in muscular power or in co-ordination. It is only by attention to these points that certain diseases of the nervous system can be distinguished from diseases of the eye.

DR. JACKSON: The paper of Dr. LeMond covers so many points that it would be quite impossible to discuss it in detail. But the first point, in reference to what occurs in astigmatism —the significance of the symptoms that arise from it—is one that ought to be more generally recognized, and more constantly borne in mind. I think it is a natural mistake to make, to put eye-headaches or the other symptoms that arise from eye strain, rather apart by themselves, regarding them as belonging peculiarly to the eye, to be treated by glasses and not having general relations, whereas they are in no sense peculiar. They depend probably on precisely the same functional conditions that other headaches depend upon. They are essentially the same as to location, and are subject to aggravation or amelioration by the same influences as other headaches. By bearing these things in mind one will avoid a good many mistakes as to the significance of headache and allied symptoms, and a good many unnecessary failures to relieve them.

ANGIO-NEUROTIC ŒDEMA OF THE OCULAR CONJUNCTIVA.

G. MELVILLE BLACK, M. D., DENVER.

On the twenty-eighth day of last February I was called to see a man thirty-two years of age, occupation head waiter, who,

they informed me, had "got some kind of poison in his eyes and that they were swollen shut." I presumed that he had gonorrhœal ophthalmia. Upon arriving at his bedside the appearance of the lids was certainly quite characteristic of that formidable trouble. Both the upper and lower lids of each eye were swollen and red, with a large fold of ocular conjunctivæ protruding from between the lids, forming a large roll above and below the corneæ, but there was absolutely no discharge whatever. This roll of swollen conjunctivæ had a yellow œdematous appearance and was somewhat firm to the touch. The corneæ were clear. He made considerable resistance when lids were separated, and complained of great photophobia and pain. This condition, he informed me, had been present for about twelve hours, but his eyes felt irritable for twenty-four hours previous to this. The swelling of lids and ocular conjunctivæ was ushered in by severe pain in eyes, and along the track of supra-orbital nerves, as well as in the back of of head and shoulders. He also had considerable pain in lumbar region. His urine was scanty in amount and highly colored, he was constipated and gave some symptoms of stomach derangement. Dr. S. D. Hopkins, his regular physician, was called, and prescribed for his general condition and examined his urine. The latter was found loaded with urates and some phosphates, but was free from albumen and sugar. Doctor Hopkins prescribed a tablespoonful of the infusion of digitalis every six hours, two teaspoonsful of Mag. Sulph. every two hours for thirty-six hours and fifteen grains bismuth sub-nit. three times a day. His heart was found to be normal. Two weeks previous to this attack he had pain in his stomach, with a feeling of heaviness there after eating. Six months previous he had an attack which his wife pronounced "hives." The local eye treatment was iced cloths and a 2 per cent. solution of antipyrine dropped between the lids every two hours.

In three days' time all the conjunctival and lid œdema had subsided. He could open his eyes freely to the light, all pain in the eyes and elsewhere about the body had ceased, vision was normal and opthalmoscope showed interior of eyes normal.

Now the question arises, How should this case of conjunc-

tival œdema be classified? Dr. Charles J. Kipp reports a similar case in volume six, page 415, of the "Transactions of the American Opthalmological Society." He diagnosticates his case as one of "Bi-lateral Inflammation of Tenon's Capsule, in connection with Profound Mercurial Poisoning." About the only points of difference between Dr. Kipp's case and mine lie in the causation, and that in his case there was a protrusion of the eye ball. In my case there was no exophthalmos.

Dr. Swan M. Burnette, in the "Archives of Opthalmology," volume twenty-one, page 259, reports a very similar case to mine, of "Chemosis of the Conjunctiva and Lids caused by the indigestion of a single grain of quinine." He does not say if his patient experienced pain in the eye or not; in my case, the pain and photophobia were very marked. In his case he says, "In early life quinine taken in any quantity produced urticaria."

Dantone reviews a case on page 149, volume twenty-one, "Archives of Ophthalmology," reported by Geraita, which he subscribes as "Diffuse Lymphoma of the Conjunctiva." This case seems to have been very similar to mine, and microscopical examination of a few of the excised pieces of the conjunctiva revealed an extensive collection of lymphoid cells.

After having gone through an enormous amount of ophthalmological literature, I have succeeded in finding only these three cases which bear anything like a close analogy to the case I have reported.

Marked œdema of the ocular conjunctivæ is a prominent symptom of orbital cellulitis, but should not be confounded with transient œdema. It is not uncommon to find œdema of the conjunctiva from malignant growths in the nose or its accessory cavities, or from acute or chronic inflammations of these cavities, attended with purulent nasal discharge. In my case there was no disease of nose or accessory cavities. We find conjunctival œdema in advanced cases of disease of the kidneys and heart, but it is not transient in character. I remember a very marked case of conjuctival œdema in a woman about eighty years of age who had an aneurism of one of the large cerebral arteries. It is not infrequent in thrombus of the lateral sinuses.

Very few of our text books on medicine say anything about angio-neurotic œdema. Osler refers to it briefly and seems to think it a form of giant urticaria and dependent upon stomach derangement. On page 209 of the "New York Medical Record," volume fifty-six, Dr. M. Allen Starr in a very interesting paper on, "Localized Transient Œdema," which he also called angio-neurotic œdema, but that this term "implies a knowledge of the pathology, which is not yet established;" nor does he attempt to go into the pathology of it, and dismisses it by saying, "As to its nature or pathology, nothing is known." He reports three cases in which the etiological factor in two of them seemed to be exposure of the affected parts to cold air or cold water. In his third case no causative influence could be ascribed; it was localized in the left hand, and dipping this hand in cold water would cause the œdema to become greater and more painful. In his cases the stomach could not be regarded as an etiological factor, nor do they bear any resemblance to urticaria.

Crocker* speaks of "acute circumscribed œdema" as one of the "variations of urticaria," or so-called "Quincke's disease, in which the orbital tissue, or that of other parts of the face, may swell up into a large tumor, or there may be a large ill-defined swelling of a greater portion of the limb or other part of the body, from the sub-cutaneous œdema." Crocker takes the stand that acute circumscribed œdema is one form of urticaria.

Quincke† and Strubing‡ reported cases under the name of acute circumscribed cutaneous, or angio-neurotic œdema, in which the œdema affected chiefly the face, several times the mucous membrane of the tongue, soft palate and larynx, although in a considerable number of instances the trunk showed like lesions.

Dr. M. B. Hartzell, in a paper on, "Acute Circumscribed Cutaneous Œdema," reports the case of a man forty-five years of age, who had recurring attacks of acute circumscribed œdema of the head, face, larynx and left forearm. He was subject to

*Diseases of the Skin. Second Edition.
†Monatshft. f. Praktische Dematol. 1882.
‡Zeitschft. f. Klin. Med. Bd. IX. p. 382.
University Med. Mag. Vol. II, p. 410.

attacks of urticaria of a mild type. "Gastro-intestinal derangement was completely absent both during the attacks of urticaria and cutaneous œdema." Hartzell says, "While cutaneous œdema presents many features which indicate a close relationship with urticaria, yet it possesses characteristics of its own which fairly entitle it to separate consideration."

I believe my case to have been one of true angio-neurotic œdema of the conjunctivæ.

That acute circumscribed œdema seems to have a special fondness for the face, there is a preponderance of opinion. That it involves mucous surfaces there is no doubt, inasmuch as cases have been cited where the tongue and larynx were affected. That it may affect the mucous membrane of the eye as well as the lids, I deem to be plausible. It is certainly a rare occurrence, as no mention of such a condition can be found in our text books on the eye, nor can any reported case be found in our most prominent ophthalmological literature. The condition may be easily mistaken for orbital cellulitis or tenonitis, but its transient character, together with the history of previous attacks of urticaria, should lead to its proper classification. The local treatment probably does not amount to much; constitutional medication, such as has been found of value in urticaria, should prove efficacious.

DISCUSSION.

DOCTOR ADAMS: While taking no interest in ophthalmology, I am surprised to hear that the doctor has reported certain cases as rare. I can furnish the doctor a case in about six hours, if I myself should take seven grains of iodide of potash. I am subject to asthma, and consulted a practitioner and was given a mixture containing seven grains of iodide of potash and some arsenic also; and I took one teaspoonful at 9 o'clock and at 2 o'clock I was awakened with what I supposed was a severe cold; the larynx was congested, the nares and conjunctiva swollen. For about two weeks I suffered from this, when it gradually disappeared. I had a subject in previous years that was subject, as I supposed, to quinine idiosyncrasy; I gave her an inunction of quinine containing one grain, to be applied

at once, and her condition was just similar to that which the doctor describes under the term, " Angio-Neurotic Œdema."

ETIOLOGY OF DEFLECTIONS OF THE NASAL SEPTUM.

WILBUR W. BULETTE, M. D., PUEBLO, COLO.

By deflections of the nasal septum is understood any irregularity in contour of the party wall of the nasal cavities, which renders them unsymmetrical.

Deviations of the nasal septum are quite common, and are so frequently an exciting cause of catarrhal inflammation of the nasal mucous membrane that it is important to understand the methods by which they are developed, and the results of their action upon the lining membrane of the respiratory passages.

In the normal condition the nasal septum presents simply a bony and cartilaginous party wall, symmetrically dividing the nasal passages into two cavities. Thus, in a healthy state, its function in the economy is of no great importance, except that in some portions of it we find filaments of the olfactory nerve distributed, together with certain vascular structures, both of which contribute somewhat to the great respiratory function of the nose.

I have met with several instances where the nasal septum had been destroyed to a considerable extent as the result of disease, yet no serious consequences were produced in the shape of the face or head.

Some deviation of the nasal septum is met with in probably ninety per cent. of the superior races in adult life, while in the inferior races this abnormality is much less common. It occurs more frequently in men than in women, and according to my observations is deviated to the right more frequently than to the left side.

The nasal septum is pratically composed of two bones and one cartilage; the vomer, perpendicular plate of the ethmoid, and the cartilage of the septum; and for practical purposes may

be measured as a square whose sides are three inches long, thus giving a superficial area of about nine square inches; it is supported at three points only, being practically free in the rest of its extent. It is to be borne in mind that the nasal septum is not, therefore, a firm, stiff wall between the nasal cavities, limited by a fixed and immovable framework of bone, but is a comparatively thin, vertical partition, serving as a delicate support for mucous membrane and important structures within the nasal cavities.

According to Collier, "the parts which make up the septum are subject to frequent variations; thus the perpendicular plate of the ethmoid may be very thin, especially posteriorly, and may not extend further forward than the frontal spine; or it may be quite thick anteriorly, and end in front in the form of a prow;" but generally it is thinner in the middle than at the circumference.

The vomer is chiefly affected in its anterior half, the inclination of its posterior border, and its attachment to the superior maxillary. The posterior border may be almost vertical, or inclined at a considerable angle, or it may be deeply grooved, indicating its development from two distinct plates; the anterior half may be extremely thin and cancellous, and often shows a separation between its two plates. The triangular cartilage is usually very thin and quite translucent in the center, and at this point may be deficient. Its margins are much thicker than at its center; the anterior margin is thicker above, where it fits into the groove on the anterior border of the perpendicular plate of the ethmoid; the inferior border is thin posteriorly, where it fits into the groove formed by the separation of the plates of the vomer, but is thick in front, where it articulates with the crest of the superior maxillary and joins the column of the nose.

It is to be noted that, as a whole, the anterior and central segments of the nasal septum are the thinnest, while its posterior and upper parts maintain a nearly uniform degree of thickness and consistency.

Deflections are always seen in the thinnest portions of the septum, and are never found in the posterior third of its surface.

It is not difficult to understand how a force acting in a direction at right angles to the septum can bulge a partition so thin and unsupported, and naturally liable to displacements. The falls and bumps upon the nose, of such frequent occurrence with children, while the parts are soft and delicate and specially susceptible to injury, are not a trivial matter, as they almost invariably give rise to inflammatory action, which may extend through a longer or shorter period, and finally result in a chronic hypertrophic inflammation of the nasal mucous membrane, or a rupture of some of the sutural attachments of the septum may occur; or the septal cartilage, if pressed against the vomer or perpendicular plate of the ethmoid, will cause a slow inflammatory action, and this morbid condition develops gradually a spur or ridge, and these, further developing and calling new forces into play, finally result in more or less displacement of the septum, with consequent nasal stenosis, and its attendant evils.

The cartilages of the nose are the upper lateral, the lower lateral, and sesamoid; these are so arranged as to give rigidity with elasticity, and are dominated by a double set of muscles, the dilators and constrictors, and these muscles are brought into action according as inspiration or expiration is dominant.

By the formation of the nares, and the action of the muscles which control them, they may be likened to a valve, and which, without living structures to regulate and preside over the openings, would admit the passage of air in expiration only. Proof of this is seen in the various forms of narcosis, and lesions of the facial nerves. I am convinced that partial or complete paralysis of the muscles governing the action of the nostrils is the cause of a large number of deflections of the nasal septum. In proof of this assertion, I here quote from the experiment of Ziem, who blocked up the nostril of a young animal for a long time, with the following results: "There was seen a deviation of the intermaxillary bone, and the sagittal suture toward the closed side; also, lesser length of the nasal and frontal bones, and horizontal plate of the palate bone; less steep elevations of the alveolar processes; smaller distances between the anterior surface of the bony auditory capsule and aveolar process; also

between the zygomatic arch and supra-orbital border; and smaller size and a symmetrical position of the vascular and nerve canals on the obstructed side. The distance of the two orbits from the middle line was unequal, which, as has been observed in man, leads to asthenopia, astigmatism and strabismus."

A great many theories have been advanced by scientific observers as to the causes of deflections and deformities of the nasal septum, as, "heredity, syphilis, rickets, habitually blowing the nose with the same hand, habitually sleeping on one side, tendency to vertical overgrowth of the septum, some defect in the primary laws of organization, action of astringents, habit of putting the finger in the nose, overgrowth of a component part or parts of the septum, traumatism, highly-arched palate, and congenital causes." With the exception of traumatism, it is my opinion that none of these are the primary causes of nasal deflections. We are told that the weight of the atmosphere equals about twenty-nine inches of mercury at the sea level, and exerts a pressure of something like fifteen pounds on every square inch. I have said that the average area of the septum, for practical purposes, is about nine square inches, so that a force of about four and a half pounds is exerting itself on the thin, delicate septum at every inspiration. This long-continued pressure in a direction at right angles to the septum cannot fail to push in and bulge the inner walls of the nasal fossa at its weakest point, and we notice by clinical observation that deflections always occur at the weakest and thinnest points of the nasal septum. Obstruct one nostril from paralysis of the dilator muscles of the nose, injuries, inflammation of cartilage, hypertrophy of the turbinates, polypi, or from any cause, and the result is, that the air in that nostril is rarified by the inspiratory act, and if so, the walls of the nasal cavity are subjected to a pressure exactly in proportion to the amount of rarefaction. During inspiration, the stream of air through the mouth and nostrils, meeting in the pharynx, passes into a gradually narrowed channel, so that its flow becomes more and more constricted and rapid as it passes inward, and consequently its power of suction or aspiration is greatest until it has passed the

trachea, to widen out again in the bronchi; but during inspiration every part yields to the pressure of the expiratory blast, the palate is lifted up, the pharynx is expanded, the tongue protruded forward, and the pressure and rapidity of flow greatly and rapidly diminishes, the air finding exit where there is least resistance.

From what has been said, it must be admitted that the septum is submitted to a series of intermitant blows, varying from one to several pounds to each square inch of its surface, during every inspiratory act, which must influence the position of the septum, if repeated sufficiently long, and obstruction exists from any cause.

In my opinion, deviation of the septum is the result, and not the cause, of spurs, exostoses, ridges, hypertrophy of the turbinates, and polypi.

As to the causes of deflections of the nasal septum which have been prominently advanced: 1.—Hereditary causes play a very subordinate part, in so far as prominent or malformed nostrils may be a cause of obstruction to breathing. An inherited tendency to colds, enlargements of the inferior turbinated bones, polypi, or new growths being transmitted, may, when developed, obstruct and impede respiration, and so deviate the septum. 2.—Syphilis may, by ulceration and consequent softening of the tissues, obstruct the nares and bulge the septum, but according to my observations, syphilitic lesions in the nasal fossæ run a comparatively rapid course, and develop ulceration with necrosis very quickly. 3.—Rickets, also, may, by softening the tissues and delaying ossification, as we see in the long bones and those of the cranium, produce spurs and ridges as does syphilis, and secondarily produce deflection of the septum. 4.—Habitually blowing the nose with the same hand, tendency to vertical outgrowth of the septum, habitually sleeping on one side, some defect in the primary laws of organization, action of astringents, habit of putting the finger in the nose, overgrowth of the component parts of the septum, and highly arched palates, all of which play absolutely no part whatsoever in deflections of the septum, and surely must have been advanced under the veil of ignorance. 5.—Congenital

causes. I admit that fractures and displacements in utero are possible, but, according to clinical observations, one rarely or never sees a deviation of the nasal septum before the third year. 6.—Traumatism is a most potent cause, and the clinical history of such cases is positive and direct evidence of septal deviation. A blow upon the nose, by accident or otherwise, as has been seen, almost surely sets up an inflammatory action, which gradually develops hypertrophy of the mucous membrane and underlying tissues, and results in angular spurs, ridges and exostoses, causing obstruction to breathing, setting new forces into play, and development of chronic nasal catarrh, with its attendant train of symptoms and resulting evils.

INFLAMMATION OF THE MIDDLE EAR WITH INVOLVEMENT OF THE MASTOID. REPORT OF CASES.

WM. C. BANE, M. D., DENVER, COLO.

I have no apology for presenting this subject, for, since the valuable work of Macewen on pyogenic diseases of the brain and spinal cord has been given to the profession, our regard for the ear and its relation to the brain has been greatly increased.

For years the danger of neglecting the old standing cases of otorrhœa has been emphasized, but only within the last decade has a radical treatment of such patients been made clear. It remained for Schwartze, Hartmann, Stacke, Gruening, with some others, to give us the technique, and demonstrate the value of a surgical procedure for the cure of this dangerous class of ear cases.

Macewen in the preface to his work states that, "since the majority of pyogenic affections of the brain arise from neglected otitis media, they ought to be regarded as preventable diseases and their prophylaxis scrupulously attended to."

I shall not consume your time in reviewing the anatomy of the middle ear and mastoid, nor in describing the radical

operation, as they are very clearly given in the recent publications on diseases of the ear.*

The following selected cases are typical of some of the forms in which the disease is encountered.

CASE I. CHRONIC OTITIS MEDIA WITH CERVICAL ABSCESS. OPERATION—RECOVERY.

H. F. A., aged 59 years, German, hotel-keeper.

History: Family history negative. Has enjoyed fairly good health, but since the late war has suffered with internal hemorrhoids, which at times have bled quite freely. He has been accustomed to drinking liquors.

In November, 1893, he had an attack of inflammation of the right ear. The pain was slight, lasting but a few days, and was followed by discharge, which continued about two weeks. A few weeks later the ear began to discharge again, and became quite painful, so that his sleep was interfered with. Early in February, 1894, he placed himself under the care of an aurist of this city, who treated him two months. In the latter part of March, 1894, he came to my clinic, and asked me to examine his ear. An examination revealed a small perforation in the upper posterior quadrant of the right tympanic membrane, through which an offensive muco-purulent discharge was coming. There was tenderness and swelling of the tissues covering the mastoid. He complained of pain in the right side of his head, and some dizziness. I advised an operation, but when I learned that he was under the care of an aurist I declined to treat him, and advised him to return to his physician.

During the third week in May, 1893, the patient came to my office, and asked me to take charge of him. In the interval he had been under the care of three different physicians. He was in a distressing condition, having a care-worn expression, complexion dull and muddy. Below his right ear was a swelling, the size of half a goose egg. The disease had manifestly advanced in its destructive course. I found a free yellowish-green discharge coming from the canal; tissues covering the

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* A most excellent treatise on this subject, by Dr. E. B. Dench, of New York City, has just been issued by D. Appleton and Company.

mastoid slightly swollen. From the mastoid downward and backward the tissues were swollen and boggy; the posterior auricular glands were indurated and were very much enlarged.

Patient was admitted to St. Luke's Hospital on the morning of the 25th of May, 1894. Pulse 100, temperature 101.- Urine free from albumin and sugar.

Operation, 4 P. M. After the usual preparatory steps, ether was administered. A large quantity of yellowish-green pus discharged from the external meatus as the dressings were removed, indicating a free communication between the ear and the abscess in the neck. A free incision was made from the apex of the mastoid upwards, 4 cm. The outer surface of the mastoid and its cells were found to be healthy. The incision was extended downwards into the abscess, from which between four and five ounces of pus was evacuated. The disease had extended from the antrum through the under surface of the mastoid into the tissues of the neck. Some of the posterior auricular glands were broken down. The diseased tissues were removed with a curette; then a counter opening was made at the lowest point of the abscess, and all the parts cleansed with 1-4000 bichloride of mercury. The mastoid wound was packed with iodoform gauze, and a drainage tube passed through the abscess cavity of the neck. The parts were cleansed daily with pyrozone. There was no discharge from the ear after the operation. The temperature fell to normal on the second day and remained so. At the end of the fourth week the wounds were closed.

Patient reported at my office on the 10th of this month; the ear has remained well, the hearing being quite equal to that of the other ear, that is, he hears the watch on contact. Both tympanic membranes are dull and thickened. It is manifest that it was more good luck than good management that the patient did not have an abscess of the brain instead of the neck. However, I shall not censure the physicians, as the fault may have been with the patient in not submitting to their judgment.

CASE II. OTITIS MEDIA WITH MASTOIDITIS. OPERATION—RECOVERY.

J. M., aged 27 years, American, carpenter.

History: Has always been healthy. On the 6th of

November, 1894, he was exposed in a storm while driving from Colorado Springs to Denver. That night a severe pain developed in the right side of his head and ear. He was delirious for about three days, when a discharge began from his right ear. On the 16th of November he came under my care at the dispensary of the University of Colorado. He was very much exhausted, being scarcely able to walk.

Hearing: Right, watch, faintly on contact. Left, 50-60.

Right canal filled with muco-purulent discharge. A large perforation in the posterior half of tympanic membrane; swelling in front, back of, and below the ear. Canthardial collodian applied in front and back of pinna; ear cleansed with pyrozone, and patient directed to keep the ear cleansed with warm salt water. For the next three weeks he seemed to improve under local and constitutional treatment.

The perforation being large, the cleansing and antiseptic solutions not only cleansed the middle ear, but passed by the Eustachian tube to the throat.

On December 11th, he complained of dizziness, which impressed me that an operation was indicated. His temperature at that time was 100 2-10. I called the attention of my colleague, Dr. John Chase, to the case, who, after an examination, advised waiting for further developments. There was no material change in his condition until December 16th, when he was taken with a severe pain in front of the ear, which lasted about an hour, and was followed by a prominent swelling, extending forward to the outer canthus of the right eye. On the following morning I found the swelling as above, and also considerable swelling and tenderness of the tissues over the mastoid and below the pinna, with induration of the posterior auricular glands. Pulse, 130. Temperature, 101. He being unable to pay for a bed, I arranged for him to go to the County Hospital to be operated upon. Eight days later I was asked to see the patient at his sister's, in North Denver. I found him feeling better, he having spent four days in the hospital. His ear affection, however, was not improved, though there was less tenderness of the parts. Pulse, 110. Temperature, 101. Optic discs normal.

On December 25th he was admitted to St. Luke's Hospital. Operation, December 27th. I did what has been termed the *classical mastoid*, or Gruening's operation, removing the entire cortex, which was filled with pus, granular tissue and carious bone. The wound was cleansed with 1-4000 bichloride solution, packed with iodoform gauze, and covered by the usual dressing.

No pus was discharged from the wound or ear after the operation. At the end of two weeks the mastoid wound was closed. Patient's temperature was normal from the day after the operation. I inquired of him on the 14th of this month, and learned that his hearing was good, and that his ear had not given him any trouble since he was operated upon.

CASE III. SUB-ACUTE OTITIS MEDIA. TENDERNESS AND SWELLING OVER MASTOID. OPERATION—RECOVERY.

Mrs. J. J. M., aged 23. American.

History: General health not good. Hearing has been defective for ten years. About the first week in January, 1895, acute inflammation of the right ear developed. The ear pained her for eighteen hours, when it began to discharge; aching and discharge have been continuous.

Patient came under my care on the 29th of February, 1895. Hearing, right ear, 1-60; left, 18-60. Right canal filled with discharge; tympanic membrane inflamed, and a small perforation exists in Shrapnell's membrane. Perforation enlarged, and ear cleansed with pyrozone. Ear was cleansed with hot salt water several times daily. The discharge and pain diminished until March 8th, when the pain became very severe in, and back of, the ear, with some swelling of tissues over the mastoid, the discharge having stopped on the previous day. On the morning of the 9th there was a return of the discharge; the pain had diminished somewhat, but the tenderness in the ear and mastoid remained about the same. Pulse, 100; temperature, 99 5-10.

During the afternoon of March 9th, patient was admitted to St. Luke's Hospital, and prepared for an operation.

Operation, March 10th, at noon. Ether was administered. Mastoid found to be engorged, but did not contain any pus.

The posterior bony wall, down to the antrum, was removed, and the parts thoroughly cleansed with 1-4000 bi-chloride solution; wound was packed with iodoform gauze, and then covered with the regular sterilized dressing. The next day the temperature was normal. There was no discharge from the ear or wound after the operation. In two weeks the mastoid wound had healed. A linear keloid developed in the upper end of the wound.

Patient was in my office on the 25th of May. Her ear has not given her any trouble, and she states that the hearing is as good as it was previous to the inflammation.

CASE IV. ACUTE OTITIS MEDIA INVOLVING MASTOID.

H. A., aged 13 years. American.

History: Came under my care September 21, 1894.

General health is good. Left ear was affected when he was 6 months old with inflammation and discharge. During the past two years he has had some pain in, and, at times, discharge from, the left ear. Ten days ago the left ear became very painful, and a discharge soon appeared. Hearing, watch, right, 8-60; left, on contact. Right canal free, tympanic membrane dry, dull and thickened. Left canal is moist with a muco-purulent discharge. There is a perforation between three and four millimeters in diameter in the lower posterior quadrant of the tympanic membrane. Tenderness in mastoid, upon pressure. Patient has had pain back of the ear for three days, has had chilly sensations for past two days. Pulse, 90; temperature, 99 8-10 at 11 A. M.

TREATMENT: Ear cleansed with pyrozone; canthardial collodian applied over the mastoid. Calomel internally. Ear to be cleansed with hot salt water.

September 22nd, 11 A. M., temperature, 99 8-10; some chilliness.

September 24th, 11 A. M., temperature, 99 3-10; discharge free.

September 25th, 11 A. M., temperature normal.

October 8, 1894. Patient has been treated daily by cleansing. Discharge has ceased, and tenderness disappeared. Hearing, watch, right, 15-60; left, 18-60.

Patient remained under my care for two months after his ear was well, while I treated him for trachoma.

CASE V. ACUTE OTITIS MEDIA WITH MASTOIDITIS. OPERATION—RECOVERY.

T. E. W., aged 41. American; attorney. Was referred to me by Dr. T. J. Eskridge, on May 24, 1895, as the telephone message to him indicated that the case was one of ear disease.

At 11 A. M. I found the patient tossing about his bed in agonizing pain, located in his right ear, mastoid and side of his head. He had been suffering for thirty-six hours. Hearing, watch, right, 2-60; left, 50-60. Moderate tenderness to pressure on the tragus; marked tenderness to pressure on the mastoid. Inner half of canal swollen, most marked in the supero-posterior wall, near the tympanic ring. The drum membrane congested. Pulse, 84; temperature, 101. Bowels constipated. Hypodermic of 1-4 of a grain of morphine, with 1-120 of atropine, administered. Upper inner wall of canal incised. Leeches in front and back of ear. Ice poultice to the mastoid; hot water to the canal. Calomel by mouth every two hours.

The pain was controlled by an anodyne at intervals for two days. The ice poultice failing to abort the mastoid inflammation, cauthardial collodian was applied.

Dr. Eskridge and Dr. T. E. Taylor, the family physician, saw the case with me on the second day, and confirmed the diagnosis. The pulse ranged from 84 to 96, and the temperature from 100 to 102 1-2, for five days, when there was a free discharge from the ear. However, the tenderness in and back of the mastoid did not subside. As the greater inflammation was in the mastoid, rather than in the middle ear, I was unwilling to assume the responsibility of not opening the mastoid and relieving the engorgement, as I felt convinced that it would soon break down. The patient, knowing his condition, readily consented to have an operation performed. The left optic disc was hyperæmic.

Patient was admitted to St. Luke's Hospital on the morning of May 30th, and prepared for operation. Operation, 4:30 P. M. The tissues over the mastoid were considerably swollen.

The mastoid was found to be very much engorged, and some of the tissue appeared, macroscopically, to be broken down. The wound was packed with iodoform gauze, and covered with sterilized dressings. Some of the scrapings from the mastoid were placed in sterilized gauze, and later, examined microscropically by Dr. Crouch, the bacteriologist, who found them to contain pus cells and streptococci.

On the second day after the operation, patient's pulse and temperature were normal, and he had a good appetite. Previous to the operation he had not cared for food. On the third day the temperature and pulse went up, temperature ranging from 99 to 101 for the next five days. He developed rheumatic pains in the right arm and leg, for which he was given salicylate of sodium, which gave him relief, and brought his temperature down to normal in forty-eight hours. On the second day after the operation there was some discharge from the mastoid wound, which has been continuous. Wound was cleansed with 1-4000 of bi-chloride of mercury for about a week, when formalin solution, 1-1000, was substituted, which caused a marked diminution in the amount of discharge. Nineteen days have elapsed since the operation; wound is almost closed. Hearing, watch, is 5-60.

REMARKS:—

Further comment on the first case is scarcely necessary. The indications for operation were so plain that any one should have recognized them.

The second case illustrates one of the most acute types of the affection. The constitutional involvement was very marked at the beginning, and the local disease was certainly sufficiently active to call for an operation much earlier than it was performed. Had the circumstances been different, I would have insisted on an operation earlier than I did. The amount of destruction that had taken place in the mastoid, clearly proved that delay beyond the first ten days or two weeks was unwise. It is in just such cases that Nature may, in her efforts to get rid of the disease by absorption, convey the pyogenic material to a more vital portion of the system, and disastrous results follow, as, thrombosis of the lateral sinus, or abscess of the brain.

The third case was operated upon at a time when the mastoid was threatened, and clearly demonstrated the wisdom of operating early, as it not only saved the mastoid, but at once cured the middle-ear disease.

Fourth case was treated according to the indications, and yielded to cleansing and counter-irritation. While he was cured, the time may come when he will have a relapse.

With a thorough knowledge of the anatomy of the mastoid and adjacent parts, the operation can be done *antiseptically*, without fear of bad results. Macewan has performed the operation thirty-eight times, with as many recoveries.

In fifth case there was unmistakable evidence that the mastoid was involved in the inflammation, and this was proven by the streptococci and pus cells contained in the scrapings. Had I postponed the operation, caries of the bone would have occurred, and at the same time the system would have been burdened by absorption of the pyogenic product.

Patients with chronic otorrhœa, or those who have relapses, are in danger of pyogenic infection. In the light of the present day, we are seldom justified in permitting such patients to pass from under our care, without, at least, urging that they undergo the radical operation.

OBSERVATIONS REGARDING EYE-STRAIN AND ITS RELIEF.

EDWARD JACKSON, A. M., M. D., DENVER, COLO.

There is a common impression that eye-strain is simply and solely a result of ocular defects; that without some ocular fault you do not have eye-strain; that the discovery of some marked anomaly of refraction, or of the ocular muscles, is the one thing needful to establish the diagnosis of eye-strain; and the correction of that error of refraction or fault of muscular balance is the sole sufficient treatment of the condition. There are, too, many physicians who, suspecting a connection between the eyes and a chronic headache, come to the ophthalmologist and ask, "Has this patient any error of refraction?"

expecting the answer to settle all questions of pathology, and a pair of glasses to sum up the treatment.

Now, as a matter of fact, ametropia of any degree may cause no eye-strain; and eye-strain can exist without any ocular defect. Of course, in a great many cases, the two are intimately associated. Ametropia is perhaps the strongest and most common predisposing cause of eye-strain; and the mass of cases of eye-strain present ametropia sufficient in amount to make it practically important. No case of eye-strain can be properly managed without a knowledge of the error of refraction present. Nevertheless, ametropia and eye-strain are different things. I have seen every grade of the various form of ametropia, in persons who used their eyes without any eye-strain whatever. I have seen typical and severe eye-strain, although the eyes were free from any optical defect.

If eye-strain and ametropia are not invariably connected, what, it may be asked, is their true relation to one another? Ametropia, fault of ocular focus, is one of several factors which, by their co-operation may cause eye-strain. It is such an important factor that it should be carefully and completely studied in every case of eye-strain. But it should be remembered always that it is only one factor, and that other factors will in particular cases prove of much greater importance. These various factors of eye-strain may be summarized thus: First: Ocular defects, including ametropia, insufficient power of accommodation, and (rarely) faults of muscle balance. Second: Improper requirements in the way of eye-work, including excessive hours of eye-work, excessive minuteness of objects looked at; inferior illumination, imperfect adjustment of optical instruments, wrong position of the object, or wrong management of hours of eye-work and recreation. Third: Defects of general nutrition, including chronic ill health, the immediate and after effects of acute specific disease, and diathetic influences. Fourth: Imperfect organization of the nervous system, or degenerative changes in it, including the influence of sudden changes in the amount or kind of eye-work and certain forms of senile decay.

These four classes include a host of individual causes that

are to be borne in mind, and their relative importance carefully estimated in the study of the individual case. Any narrower routine will at times result in unnecessary failure. But the narrower way of regarding the case is far too common.

One needs constantly to remember that an eye-headache is not aggravated only by eye-work; it may be aggravated or even set up by the recurrence of the menstrual epoch, by hunger, by anemia, by exhaustion of mind or body, or by the lowered character of the general nutrition after exhausting illness. And, conversely, it is not benefited merely by lenses or prisms, atropia or the dark room; but by sleep, food, tonics—all wholesome influences. On the other hand, it is an error equally serious to assume that because a headache is benefited by a hearty meal, or a brisk purge, or a rest from business, or a course of iron and strychnia, that eye strain can have nothing to do with it. And the same is true of the other symptoms that we group under this general head of eye-strain.

The recognition of the broader etiological relations of eye-strain cannot fail to exert an important influence on our methods of investigating and managing all such cases. For instance, when it is suspected that eye-strain is the central fact in the symptom group, other lines of study of the case will not be ignored and the whole diagnosis, prognosis and treatment founded on the results obtained with the ophthalmometer or the test-lenses. It will still be pertinent to look into diathesis; the usual workings of the nervous system, and every possible influence bearing on the nutrition of the patient, as well as the amount and conditions of his eye-work. And, again, it is not essential for the general practitioner to have at his command skilled measurements of the refraction of the eyes before making a probable diagnosis. Whether the astigmatism is 0.5 D. or 5 D., will not in itself settle the matter. In either case the decision will rest as much upon other evidence as upon this one fact. Eye-strain is recognized by the whole clinical picture it presents, not by a single feature.

To even a greater extent do these factors, other than the mere optical defect, influence prognosis and treatment. Age, especially as indicating the evolution or involution, present

or prospective, of the nervous system; the tendency of the nervous system as regards habitual, or recurring pain; the state and prospects of general nutrition; the necessary requirements of occupation on the whole organism as well as on the eye, must all be considered before a valuable prognosis can be given. And while the removal of the single causative factor will relieve some patients, the proportion of those relieved will rise with the skilful combating of every adverse and depressing influence. Glasses may be of value or essential, but so may be readjustment of eye-work, improved general nutrition, the recognition of those bounds which the constitution of the patient sets on habitual effort.

The next point to which I ask your attention is that the severity of eye-strain is not directly proportioned to the ocular fault that gives rise to it: may even seem inversely proportioned thereto. An ocular defect may give rise either to imperfect vision or to eye-strain, sometimes to both; and it is the higher degrees of ametropia that necessarily cause imperfect vision, while the lower, in which imperfect vision can be obviated by increased exertion, more commonly cause eye-strain. Then the prognosis as to the continuance of the symptoms complained of, is the more unfavorable, in proportion to the smallness of the ocular defect sharing in their causation. The factor of ametropia entering into the causation is the only one that can be always and with certainty removed. In proportion as it is relatively small, the share of the other factors less amenable to the measures at our command, becomes relatively large, and our ability to give relief correspondingly doubtful.

Particularly after middle life do small errors of refraction, or imperfections of adjustment, cause severe and persistent strain. When the power of accommodation has so diminished that the correction of 1 D. of hyperopia is quite beyond its range, 0.25 D. of the same error of refraction may prove a constant provocation to painful effort on the part of the ciliary muscle. Or an equal amount of inaccuracy in the adjustment of lenses may be equally injurious.

Another point worthy of attention is the complete difference in the effects produced by a perfectly accurate correction of

ametropia, from those of a slightly inaccurate correction. The difference in relief given is often utterly out of proportion to the difference in the refracting power, or position of the lenses. But clinically the fact is well-established. Perhaps it will help us to understand why this should be so, to remember that if an emmetrope attempt to work with a pair of 0.5 D. concave lenses, the annoyance experienced is far greater than that usually felt by the hyperope with an error of 0.5 D. The ametropia proves more disastrous to the person not accustomed to it. And if one wears the wrong glasses, the fault of focus that he has to contend with is always one to which he is not accustomed. If the inaccuracy be simply in the direction of a lower degree of the original fault, this may not be noticed if the ratio between the two eyes be properly preserved. Yet, even then the result cannot be regarded as wholly satisfactory.

Finally, as regards relief of eye-strain through the wearing of glasses, let me call your attention to the practical importance of the *period of adaptation* to the use of glasses. In nearly all works on the subject, this period of adaptation is slighted or ignored. It is commonly stated that the wearing of convex lenses, correcting their total hyperopia, by young persons, will at first cause blurring of distant vision; and sometimes it is mentioned that strong concave lenses may at first prove unsatisfactory for near work. But no adequate impression is given of the fact that nearly every pair of glasses adjusted, if they be adjusted to the needs of the case, and of more than trifling strength, will at first cause discomfort and aggravation of the symptoms of eye-strain, or, at least, markedly less comfort than they will give when the eyes have become accustomed to working through them.

It is a matter of the first practical importance that this period should be borne in mind, and the patient fully warned of its existence and characteristics. Some of you will remember the story of the African adventurer who restored his imperilled influence over his native followers by calling them before him, placing on the tongue of each a couple of grains of tartar emetic, and solemnly announcing they would vomit. According to the account of the native, "He told us we would vomit; and,

by Allah! we did vomit. Great is the Prophet!" So, if, with the prescription of a pair of glasses, full warning is given of the period of slight pain, or increased discomfort, its occurrence will only stimulate confidence in the knowledge and frankness of the prescriber, and help to secure a full and fair test of the value of the lenses. While the occurrence of the same train of symptoms, without any previous warning regarding them, has too often, by destruction of confidence, proven a disaster to both physician and patient.

INFILTRATION OF THE LARYNX.

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It seems to me, from my observations, that the character and course of infiltration of the larynx, whatever be its cause, depends upon its position. If a tubercular or syphilitic deposit occurs where there is a large amount of sub-mucous tissue, with few bands, there is immediately a pronounced swelling, and little ulceration. If, however, the deposit be in a part where there is little sub-mucous tissue, then we have little swelling, and rapid ulceration.

I take from my notes a case illustrating both of these types.

Mr. J. A., accountant, of good family history and habits, was pronounced to be tuberculous in the East, and came to Colorado Springs. His lungs were examined, and a small cavity found in the right lung, and consolidation in the left apex. His voice was almost gone, and his throat pronounced tubercular. His lungs did fairly well, but his throat did badly, in spite of lactic acid applied by his physician. He was sent to me, and I found his lungs badly involved, with a large number of tuberclebacilli in the sputum. There was extreme emacia tion, and he was so weak that it was difficult for him to come to the office. The larynx was especially interesting. There were large swellings over both arytenoids, the larger over the right. The right vocal band was motionless from involvement of the crico-arytenoid articulation. The left vocal band was ulcerated along its entire length, but still had some movement. The

lower half of the epiglottis and the anterior commissure was the seat of an active ulceration. The breathing was slightly stridulous on exertion, there was no voice and all movement of the larynx was painful. After cocoainizing, I curetted the epiglotic ulcer thoroughly and rubbed in pure lactic acid. This gave him much discomfort, and after a week of soothing applications as there seemed to be an increase in size and virulence of the ulcer, I curretted again and applied eighty grains to the ounce nitrate of silver, to the ulcerated band. I applied also Ag. No. 3, without curetting, to the infiltrations, as they were of long standing, I did nothing directly. There was improvement at once, but in a different way. The ulcer of the epiglottis healed in about one month, and in doing so it rolled the epiglottis in the long axis of the body. The cord, however, ~~through~~ threw out small projections of granulation tissue a slowly proliferating mass. In this condition I stopped treatment for a month, seeing him from time to time; at length, three months after my last treatment, he came to me for what he called asthma, recently developed, and I found the epiglottis healed, the infiltrations stationary and the granulation tissue on the left cord occluding the lumen of the glottis. The posterior commissure was also encroached upon by the granulating process. I introduced a whistlers cutting dilator and opened the rimaglottis thoroughly. I tried the ordinary cutting forceps (McKensie), but failed to reach the mass, as the patient had a long neck. The dilatation gave him instant relief, and I dilated every third day until I was able to get an extra long forceps. With this I removed the growth piece by piece, until he seemed to have sufficient space through which to breathe. While operating it occurred to me that if I removed too much tissue, food, etc., might pass into the trachea, as the right band was motionless and the left, on which the mass grew was only slightly movable, and epiglottis crippled. So that I removed only enough to allow fair access of air to the lungs. It is now eight months since the operation and there is no ulceration, no raw or proliferating surfaces. The glottis is patent, the patient seems in excellent health and the pulmonary as well as the glottic processes seem arrested.

The growth removed contained tubercle baccilli.

AN IMPROVEMENT OF WRIGHT'S SNARE.

E. T. BOYD, M. D., LEADVILLE, COLO.

The improvement consists of a barbed needle, extending from spring catch of snare to within one-quarter of an inch of the end of canula.

The needle is attached to snare by one round and one square loop, which slide along canula, and main body of snare, respectively.

Base of needle-bar is graduated from before, backward, for one and one-half inches, that the operator may know the extent of its introduction, and it is provided with a push-button.

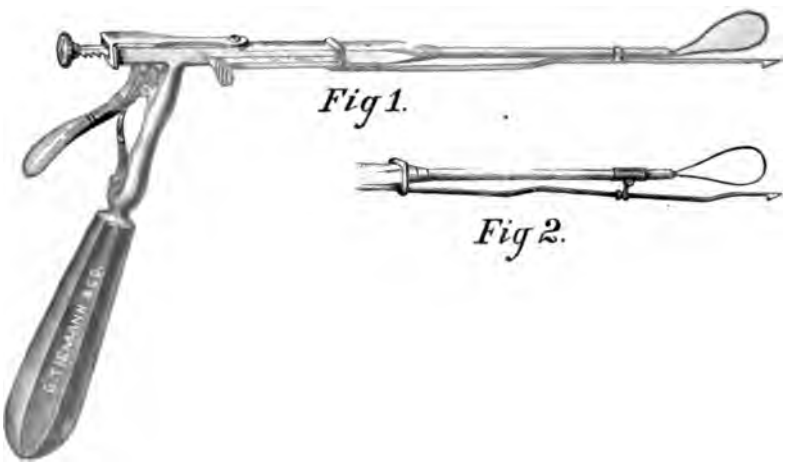


Fig 1.

Fig 2.

In using the instrument, it is well to bend the wire loop upward to a right angle to canula, retract it for introduction, and when the stylet is again pushed forward, the loop will be at an angle of about forty-five degrees from the end of the canula.

In this way, the growth may be seized well at its base, and the loop escape engaging the needle, a complication to be guarded against.

I have found this instrument to be of special service in the removal of turbinal varix, and other forms of posterior-hypertrophy, in which cases I use it as a transfixion needle.

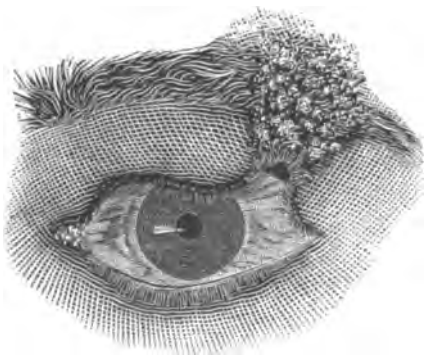
I wish to thank Messrs. George Tiemann & Co., of New York, not for carefully following my directions, but for so modifying them as to give me a neater and more efficient instrument.

BLEPHAROPLASTY BY THIERSH SKIN GRAFTS.

JOHN M. FOSTER, M. D., DENVER, COLO.

On account of the frequent occurrence of injuries, burns and abscesses of the lids, which are followed by loss of substance, and ugly cicatricial contractions, and our often-times unrewarded effort to overcome the deformities, I deem it not inappropriate to present to you the following case.

The accident occurred while attempting to stop a runaway team of horses in January last. The patient was thrown violently to the ground and received a severe lacerated wound of



the left upper lid, including the cilia margin, extending upward through the brow, three-quarters of an inch upon the forehead. The wound was a deep one, and despite the best of care, resulted in an ugly deformity. Dense cicatricial tissue formed, distorting the integument of the brow and drawing the central portion of the outer third of the upper lid upward, binding it firmly to the rim of the orbit, entirely obliterating the inch or more of loose skin and cellular tissue that permits the free movement of the parts. The connection between the lid

and bone was so firm and intimate that closure was impossible: the eyeball was thereby deprived of its moisture and protection, exposing it to the dessicating and harmful influence of constant exposure to air and dust. Naturally, this was resented, as shown by the injection and irritation of the conjunctiva, and a slight haziness of the cornea.

More on account of the last symptoms, of congestion and haziness, than for cosmetic effect it was deemed necessary to operate when I first saw the case, some four weeks after the accident. This was done on February 11th last.

There are a few points about the technique, solutions and dressings that seem to me to be of enough importance to warrant me in consuming a small portion of your time in mentioning them. As it was decided to use Thiersh's method of skin grafting, the region of the eye, and that of the inner aspect of the left arm, where the graft was to be taken, was cleansed thoroughly the night before with soap, bichloride solution 1-2000, and finally bound up with sterilized dressings wrung out of salt solution. Ether was administered. An incision was made, commencing at a point near center of lid and four lines of the cilia, extending outward through the cicatrix, ending at a distance one-quarter inch beyond. The skin and bands were entirely severed. The edges of the integument at its cut border were lifted with rat-toothed forceps and a large amount of cicatricial tissue broken up and removed. The margins of the upper and lower lids were then brought into apposition and sutured, thereby forming a large raw and bleeding surface, one inch long and one-half inch in height. After all hæmorrhage had ceased, the grafts were removed from the arm with a sharp razor, only the outer layers of the skin being included. These were allowed to remain on the blade, cut in three sections to suit, and finally washed off onto the prepared surface by a physiological salt solution, care being taken to cover it entirely and to allow a little lapping upon the healthy skin around. Rubber tissue was then applied and a thin compress held by a bandage. These were left in place forty-eight hours, and when removed the grafts were alive and free from pus. Only salt solution was used in dressing, once every twenty-four hours, and rubber tissue and bandage as be-

fore. The patient returned to his home in Colorado Springs in two weeks with grafts formed into good, strong tissue, and the lid fairly approximating the globe. It became apparent to him, however, in a short time, that contraction was taking place again and he returned to me on March 23rd, forty-three days after the operation. The condition was found to be a great improvement over his former deformity, but it was apparent that all had not been accomplished that should be. Assisted by Dr. C. A. Powers, we decided to do Thiersch's grafting again, but to prepare the surface somewhat differently. The same precautions were taken in regard to the eye and arm: ether anæsthesia. An incision was made through the integument two lines from the cilia, running parallel with them from center of lid to the outer commissure. The second incision commenced at its center, running at right angles upward, across the original graft, through the brow well up upon the forehead. After dissecting out the cicatricial tissue, especially under the brow, and suturing the edges of the lids together, we had a large triangular surface with its base downward, corresponding to the cilia border. So much of the deep tissue had been cut away that the upper edges of the wound presented the appearance of an overhanging creek bank when it has been washed out underneath. It was difficult to control the hemorrhage entirely, and, although great stress is laid upon this point, we were unable finally to control it altogether. The grafts were much thicker this time, including the entire thickness of the skin. Salt solution only used. The grafts were cut in five sections, and laid carefully upon the wound as before, care being taken to have them conform to the caved-out banks of the upper surface of the wound and held there by snugly-fitting, absorbent cotton pledgets. Dressings as before. In forty-eight hours the bandages were removed, and found partially soaked in blood, but grafts looking healthy. Cleansed and dressed every morning for three weeks, then all dressings discontinued and aristol dusted over. The sutures were renewed holding the lids together and left in position, to overcome whatever contraction that might be going on, until May 11th, forty-eight days after the operation. I am able to present the ultimate result of these procedures

through the kindness and courtesy of my patient, whom I now present to you; this being the twelfth week after the second operation.

You will notice that the grafted surface is firm, healthy integument, and that the contractions have been so far overcome as to allow the lid to lie snugly against the globe and to close evenly against the lower lid. You will also notice that so little of the muscles have been destroyed that the patient closes and opens his lid perfectly.

REFLEX IRRITATIONS FOLLOWING EYE-STRAIN.

DAVID H. COOVER, M. D., DENVER, COLO.

In the last fifteen years the importance of the study of the eye in functional nervous diseases has been more and more recognized by the ophthalmologist, neurologist, and the general practitioner; they have side by side proven the importance of ophthalmological examinations in general medical diagnosis.

I do not pretend to say that all reflexes are produced by the eye. Nevertheless, the cases I report will demonstrate that an unsuspected eye-strain is frequently the true cause.

It is universally admitted that the pathological condition of the eye and other parts of the organism are in very intimate relation with each other. To overcome a strain requires an effort. A constant or ineffectual effort of any abnormal organ will produce strain, with the resultant irritation. Then, it is not at all remarkable that an abnormal condition of the visual organs should cause reflex irritations of so annoying a character as headaches, vertigo, nausea, gastric disturbances, nervous irritations and depressions, or even those of a more serious nature, as chorea, epileptic and cataleptic forms of convulsions. When one considers the close relation existing between the delicate nerves of special sense, those of motion and sensation, besides the great vascularity of the optic apparatus with the deep-seated nervous centers, it is readily understood why such varied symptoms obscure from one, their true cause.

The eye is bountifully supplied by nerves and vessels having their origin in the brain, and, in connection with others, the sympathetic system, produce, through the organs of sight, symptoms of irritation from one to the other.

In congestions, inflammations and growths in the brain from this close proximity are exposed by changes in the anatomical and functional behavior of the eye. In tumors, there is the chocked disc, or paralysis of some of the ocular muscles, or suspension of the function of some part of the retina.

In congestions and inflammations of the brain, there is the flushed disc and hazy retina; *vice versa*, ocular disease not infrequently extends to the brain. An irritation set up by a nerve gives rise to a variety of disturbances in one or more parts of the body, however distant from the seat of cause.

The normal or emmetropic eye can passively take in objects more than twenty feet away without an effort of accommodation. Anything closer requires a slight adjustment of its delicate mechanism by calling into action the ciliary muscle.

One of the most distinguished botanists, James, an authority upon mosses, actually transformed his eyes to conform them to his studies, by constant alteration of the natural focal distance. Sailors are proverbial for their ability to see long distances.

The eye is an important index to the practitioner in determining diseased conditions, both topical and systemic. The black eye of a brawl is so patent that its possessor must explain its cause to his friends, while the listless, expressionless eye of low fevers is an indication of excessive physical depression.

The defects which cause eye-strain are hyperopia, high grades of myopia, astigmatism, and insufficiency of the ocular muscles.

Hyperopia is the "short eye." Here the refractive power is too low when the eye is adjusted for distance, parallel rays of light are not brought to a focus upon the retina, as in the normal eye, but behind it. The eye is never at rest except when it is closed, an effort of accommodation is called into action for distance. Hence, looking at objects near at hand, the demand upon the ciliary muscle is very great; it has no chance

to regain its power, as in emmetropia. This muscle soon gives way, and eye-strain becomes manifest.

It is not so in the myopic eye, the "long eye." Here the conditions are reversed, the refractive power is too high, the anterior posterior axis is too long, parallel rays of light are brought to a focus in front of the retina; the effort of accommodation for distant and near objects is less than in the normal eye, very little eye-strain is experienced, except in high grades, when near objects, such as reading, sewing, etc., are brought very close to the eyes, then we find there is an extra amount of convergence, thus over-taxing the internal rectus muscle, which, when become weakened, will give rise to fatigue, and reflex manifestations follow.

Astigmatism: This defect is one in which the refraction varies in the different meridians of the cornea owing to the inequality of its curvature, or an imperfect lens or irregular contraction of the ciliary muscle. It is the greatest mischief-maker, and produces more asthenopic symtoms than any other error of refraction. In this defect the strain is very great upon the ciliary muscle, as it must act very irregularly, as the eye always endeavors to obtain as distinct vision as possible.

Insufficiency of the ocular muscles: To obtain binocular vision we must bring into action the ocular muscles which play an important part in giving rise to the various irritations and depressions upon the general health. The muscles that control the movements of the eyes must act in harmony. If any one is at variance with the other, either from overwork, loss of power, or a weakness, so that the equilibrium can not be preserved, then it is that the demand is more than the nervous supply, and the consequence is an inability to unite images upon the same point on the retina of each eye, and single vision is not maintained. If there is any disturbance whatsoever between the convergence and that of accommodation, there will be a strain upon one or the other muscle. The ciliary and recti muscles become weakened by being over-taxed, just the same as any other in the body; as a natural consequence, eye-strain, with reflex irritations must follow. The following cases illustrate the phases of my subject:

CASE I.—Maud F., aged 15 years, on June 4, 1887, was sent to me by the family physician with the following history: Five weeks ago had a convulsion while in school; was unconscious, foamed at the mouth. She has had five attacks since the first one. The aura is made up of pain in the head, dizziness and blackness of vision, when she passes into a general tonic spasm, which lasts for five minutes. After steady use of her eyes at her studies, or much concentration, she is subject to these seizures. They occur usually at school, or after school on her way home. She has constant frontal headache, and is sometimes very nervous. No nausea. General health fair.

Examination of the eyes revealed compound hyperopic astigmatism. The following glasses were prescribed for constant use:

R. E. +1. D. $\supset$ $+0.50^{\overset{c}{-}}$ axis 180°

L. E. +1. D. $\supset$ $+0.25^{\overset{c}{-}}$ axis 90°

While wearing these glasses she had no attacks. Unfortunately she lost them, and for five days was without correction; during this time she had four attacks. Upon wearing them again, there was no return, nor has there been up to this time.

CASE II.—Mary B., aged 11 years, consulted me November 14, 1889. History: For the past year she has been complaining of headaches, vertigo, nausea, especially in the morning. Very nervous, anæmic, appetite is poor. restless at night, and has a short, hacking cough, which is increased by the nervous attacks. Two months prior to consulting me she became suddenly unconscious, body convulsed, foamed at the mouth, which lasted about ten minutes; preceding this attack she became very nervous, and had a severe headache. Has had, in all, seven convulsions. They usually came in the evening after school.

Examination of the eyes showed hyperopia of 2 D. in each eye. Ordered +1.50 for constant use. After she began wearing glasses prescribed, headache and cough disappeared, and no return of convulsions. General health improved. Three months after, had one attack of convulsions. Increased her glasses to full correction, which has given her perfect relief to the present time.

CASE III.—Dr. M., aged 26 years, dentist, consulted me November 3, 1889. History: Complained of constant pain over the brows and nape of the neck. Objects became blurred while at work. Eyes sensitive to light, and he becomes very melancholy; so much so that he dreads going to his office. At times contemplated suicide. Restless at night. Appetite poor. Has complained of this condition for the past six months.

Examination of the eyes showed: Hyperopia of 1 D. Exophoria in accommodation, 3 .

The following glasses were ordered:

+0.75 for distance.

+1. D. Prism 1° in each eye for reading.

After wearing the glasses for one month he was entirely relieved, and was able to follow his profession.

CASE IV.—Miss L., aged 19 years. Consulted me January 1, 1891. History: Since her seventh year has suffered from nausea in the morning, which lasts several hours; becomes faint, and is compelled to seek a recumbent posture. Has no desire for breakfast; if she takes any food, vomits; by noon feels fairly well. Her general health poor; extremely nervous; sleeps poorly. Her parents had tried a variety of treatments, without any relief.

Examination of her eyes revealed a high grade of compound hyperopic astigmatism.

The following glasses were prescribed:

R. E. $+4.50 \bigcirc +2.75^{\overset{c}{-}}$ axis 75°

L. E. $+4.50 \bigcirc +3.00^{\overset{c}{-}}$ axis 105°

These glasses were directed to be worn constantly. After wearing them a month, she wrote me that the nausea had disappeared, and she could enjoy her breakfast with the rest of the family.

CASE V.—Mary S., aged 12 years, came for examination on April 20, 1884. Complained of headache, which was constant, accompanied by nausea and vomiting. Was not able to attend school, as close application of the eyes always aggravated her

headache. Was under medical care for a year before consulting me. She is pale, without appetite, very nervous and restless at night, and troubled with palpitation of the heart.

Examination revealed hyperopia.

R. E. V. $\frac{20}{20}$; L. E. V. $\frac{20}{20}$.

Under atropia for 72 hours, vision was $\frac{20}{20}$, but headache ceased. With +0.25 spherical, the vision was as perfect as without. The spherical +0.25 was ordered for constant use. The result was, the headache, nausea and vomiting disappeared, and her general health improved rapidly.

CASE VI.—S. A , aged 16, male, consulted me February 13th, 1891. Showed no nervous tendency upon the part of his parentage. Never suffered from headache or vertigo. Eyes were sensitive to light. Otherwise, he has always enjoyed excellent health.

Status præsens: He has been working very hard at school. First noticed that his right hand and arm began to jerk. Right corner of the mouth twitched, and he had a peculiar jerking gait of right leg. It was difficult for him to keep the hand and foot of the right side quiet, unless controlled by an effort of the will; even then, any distraction causes motion of greater or less degree. These symptoms have been noticed for several weeks before he was sent to me.

Examination of eyes shows simple hyperopic astigmatism. The following glasses were prescribed:

R. E. $+1.25\overset{c}{-}$ axis 90°; L. E. $+0.75\overset{c}{-}$ axis 90°

These glasses were ordered for constant use. At the end of a week the twitching and jerking of hand, mouth and leg had materially lessened, and after a month all choreic movements were absent.

CASE VII.—Miss G., aged 22, consulted me April 1, 1894. Has been a sufferer from frontal headaches for a year; pain through temples and nape of neck; nausea; at times vertigo; constant twitching of eyelids; and chorea of the muscles of the face. When very tired, stammers. This is more noticeable

when she uses her eyes a great deal at school. She is very nervous and sleepless at night.

Examination of the eyes shows: Exophoria at 20 feet, 3°; exophoria in accommodation, 4° to 6°; simple hyperopic astigmatism.

The following glasses were prescribed:

R. E. $+0.25 \overset{c}{-}$ axis 180°
L. E. $+0.25 \overset{c}{-}$ axis 180° } For distance.

For reading, prism 1° was combined in the distance glasses. After wearing these glasses for two months, the above symptoms wholly disappeared.

CASE VIII.—Mr. P., aged 45 years, insurance agent, consulted me November 23, 1892.

Has had a cough for twenty-five years; always worse in the evening and night. During business hours has to cough more or less, but at night the coughing attack usually lasts until midnight. Never could lie on his right side.

The cough was a very peculiar one; dry, hollow and retching. No expectoration except after coughing awhile, then only mucous would be raised, which gave relief for a time. The days he was the busiest in his office were the days and nights he coughed the most. He was told by his physician that it came from his liver and stomach, and was treated accordingly. The most relief he ever received was when he went away; his cough was then much less, but as soon as he returned to his office the cough came back. Living in the same house with him, I studied the cough, and concluded it was reflex, and told him that I thought his eyes were the cause. Naturally, he laughed, but finally consented to have them examined.

I found he had compound hyperopic astigmatism, with 6° of insufficiency of the internal rectus (exophoria). The defect was corrected, and the following glasses ordered:

R. E. $+1. \supset +0.50 \overset{c}{-}$ axis 180°
L. E. $+1. \supset +0.50 \overset{c}{-}$ axis 180° } For distance.

R. E. $+1. \supset +0.50$ axis 180° prism 1° base in
L. E. $+1. \supset +0.50$ axis 180° prism 1° base in } For reading.

The glasses were constantly worn, and at the end of three months his cough disappeared, and he could sleep on right side as well as on left. He has had no return of the cough to the present time.

CASE IX.--Alfred F., aged 14 years, sent to me by the family physician, April, 1888.

History: During the past four months has complained of blind attacks while at school. Preceding these attacks he has vertigo; then sees red, and then all becomes black before him. Eye becomes fixed; when spoken to, does not respond. The attacks are of short duration, and he has three or four a day. After the attacks, has headaches.

Examination of the eyes showed hyperopia of 2.25 D. +1.50 was ordered for constant use. After wearing the glasses, no further trouble was experienced.

CASE. X.—Mrs. Dr. W., aged 50 years, consulted me December 26, 1894.

Has the following history: A constant sufferer of headaches, confined to over the brows and temples. Pain in nape of neck. Has had dyspepsia for years. General health poor. Very nervous, irritable, and suffers at times from palpitation of the heart.

Examination of eyes revealed simple myopic astigmatism. The following glasses were ordered: Distance—

R. E. $-3\overset{c}{-}$ axis 165° }
L. E. $-3\overset{c}{-}$ axis 30° } This correction gave perfect vision.

R. E. $+2.\bigcirc -3\overset{c}{-}$ axis 165° }
L. E. $+2.\bigcirc -3\overset{c}{-}$ axis 30° } For reading.

After wearing the glasses for three months, she wrote me she was perfectly well; "even the dyspepsia had disappeared."

CASE XI.—Miss W., aged 22, consulted me October 8, 1893; with the following history: In the past year has been suffering from headaches over the brow, pain in the nape of neck, vertigo, nausea, extreme nervousness, sleeplessness; eyes sensitive

to light, confusion of objects at a distance. For the last two years has suffered from dysmenorrhœa.

Examination of the eyes revealed the following: Exophoria at 20 feet, 3--°; in accommodation 12°, and compound myopic astigmatism.

The following glasses were prescribed:

R. E. $-1. \bigcirc -2.50^{c}$ axis 180° } For distance.
R. E. $-1.25 \bigcirc -0.75^{c}$ axis 60° }

L. E. -2.50^{c} axis 180° prism 2° base in.

L. E. $-0.50 \bigcirc -0.75^{c}$ axis 60° prism 1° base in.

The constant use of these glasses wholly relieved her, and menstruation became normal after the first month.

CASE XII.—Mr. W., aged 36 years, consulted me November 30, 1893; with the following history: Complains of a glimmering before his eyes, then objects become indistinct, floating specks before him, vertigo, nausea; would fall if he did not sit down. Has a numbness in the hands; sometimes only in one, but more often in both. His tongue feels numb, his speech thick; expresses himself differently from what he intends. Mind confused. Never loses consciousness, but thinks he is going to lose his mind. Preceding these attacks he suffers from severe headaches. Has had two attacks a week for the last six months. Has gone six months without, but this was when he was farming. Lately has been engaged in the grocery business. Since then he has had them more frequently. Gave up the grocery business, and became an attendant in the insane asylum, thinking that some day he would be one of the inmates.

Examination of the eyes revealed hyperopia of 1.25 D.

Glasses were ordered, +1 D., R. E.; 1. +D., L. E. On relief of the eye-strain, he became perfectly well.

CASE XIII.—Mrs. W., aged 28 years, consulted me July 1, 1894. Complained of frontal headache, vertigo. General health fair; appetite poor. Nausea. Confusion of objects at distance; afraid to go on the street alone on account of the con-

fusion. Has a numbness beginning in left hand, which spreads over the body. Has sensation of sinking when she lies down and closes her eyes. Extremely nervous. Sleeps very little, and cries a great deal. Impossible to use her eyes for near work.

Examination of eyes shows hyperopia 1.25 with exophoria 6° in accommodation and left hyperphoria of 2°—4° at 20 feet.

The following glasses ordered: R. E. +0.75; L. E. +0.75.

Prism 2° base down for constant use. These glasses relieved the confusion at once, and exercise of internal rectus was given daily. She gained in weight, and at the end of a month was well.

CASE XIV.—Mrs. Dr. G., aged 30 years, consulted me May 9, 1894. Has always been near sighted. In the last six months has been very nervous; irritable. Occasionally has fits of crying. Cannot sleep at night; vertigo, nausea, mental confusion. Pain in nape of neck and down the spine. General health poor, and losing weight.

Examination of eyes shows: Compound myopic astigmatism. Exophoria 6° at 20 feet. Exophoria 9° in accommodation.

R. E. $-3.50 \bigcirc -0.50 \overset{c}{-}$ axis 170°

L. E. $-3.50 \bigcirc -1 \overset{c}{}$ axis 45°

These glasses were ordered for constant use and ocular gymnastics were given daily until equilibrium was established, when the above symptoms disappeared and she began to gain in weight.

CASE XV.—Mrs. L., aged 42 years, consulted me April 11, 1894. For six years has complained of headache over the brows and through the temples, pain in nape of neck, vertigo, nausea, loss of memory, mental confusion. At times has fits of melancholy, and suffers from dyspepsia and palpitation of the heart.

Examination of the eyes revealed the following: Exophoria at 20 feet, 10°. Left hyperphoria 2° to 3° at 20 feet, 1° in accommodation. Hyperopic of 1.50

Gymnastics by prism were given daily until the equilibrium was established for 20 feet and left hyperphoria and hyperopia were corrected.

R. E. +1; L. E. +1. Prism 1° base down.

In ten days after treatment she began to improve, and has gotten entirely well. To-day in better health than she has been for years.

DISCUSSION.

DR. BLACK: The doctor certainly has had some remarkable cases. It has never been my fortune to find such cases of reflex disease as are frequently reported. Unquestionably, however, we do run across cases every now and then which are out of the general run of things, but that the correction of refractive errors and tenotomy of the ocular muscles is always to be accounted for as a cure in such cases, has been, to my mind, somewhat questionable, inasmuch as there are so many other things which are liable to be causative, and the reflex trouble disappear in the natural course of events. I think we are sometimes led into error. I am certainly very skeptical as to the value of glasses and tenotomy of the ocular muscles as a cure of epilepsy and chorea. We have a few men in the East who have reported a number of these cases as cured from such correction, and it looks as if they were cured. I am led to understand, and certainly believe, the cases cured are a very small percentage of the number of cases that have been treated in this way, the balance not being relieved. So that it is very doubtful to me if the treatment as suggested has been the actual cause of relief; and yet, when we look at it in any other way, we hardly know what cause to ascribe to it.

DR. LEMOND: I have listened with a great deal of interest to Dr. Coover's paper, and I want to say that I think when we investigate these cases more thoroughly, and ferret out these errors of refraction, that we will overcome a number of systemic troubles, or alleviate them in a great measure, at least. We do know that where tenotomy has been done in some cases, and in others where the error of refraction has been remedied by prescribing proper glasses; fits, whether epileptic or not,

have been stopped at once, and I can readily see how it is that eye-strain by being reflected directly to the brain can produce retinitis; and if we have a severe form of retinitis we may have brain irritation there; if it is continued it becomes an aggravated form, and I do not see why we could not have a number of systemic troubles coming up in these kind of cases where the brain itself has been so severely interfered with on account of deformity, or an irregular tension of the ocular muscles.

DR. JACKSON: Dr. Coover's cases of convulsions relieved by use of glasses were very interesting to me. There are a few such cases that pretty well establish the possibility of eye-strain causing epileptiform convulsions,and the possibility of their complete relief by the removal of the strain. I recall having seen but one case of that sort, referred to my clinic some years ago by Dr. Charles K. Mills. A child of about six years old was having such convulsions several times a day. One of them occurred in the clinic and was seen by several of the assistants. I did not see it myself, but it was clearly an epileptiform convulsion with a period of complete unconsciousness. The use of the mydriatic checked these convulsions entirely. The child was under the mydriatic about a week, and during that time did not have a convulsion. Coming out from under the mydriatic and by putting on correcting glasses, and wearing them constantly, there were but very few convulsions afterwards. This case I was only able to follow for a few months, and then lost sight of it. So that it can hardly be put forth as a case of permanent cure of epilepsy. We know all sorts of operative measures do suspend epileptic convulsions for a time, and probably that is the explanation of the cases of epilepsy that have been apparently benefited by operations on the ocular muscles. It is certain that operations on the ocular muscles for the purpose of relieving epilepsy are less frequent than they were two or three years ago. Soon after Dr. Stevens announced the cure of epilepsy by such operations, Dr. Mitchell, in talking with one who was very much interested and impressed with the subject, said: "If you will bring me one case of epilepsy cured by tenotomy of the ocular muscles, I will give you all the work you can do." That case has not yet been produced; and that surgeon, who

was then operating on the ocular muscles for epilepsy and chorea has ceased to do so. While it has not been demonstrated that strain of the ocular muscles was a cause of epilepsy, there are a few cases—a very few—in which convulsions certainly epileptiform, are permanently relieved by the use of glasses.

DR. COOVER: It has been my good fortune in the last fifteen years to have a number of these cases. I am certainly convinced that the glasses have cured them. These cases have come under my own observation; and no medicine was given in any one of them. The glasses evidently did improve the general condition by relieving the eye-strain.

DIAGNOSIS AND PRINCIPLES OF TREATMENT OF HIP-JOINT DISEASE.

PROFESSOR JOHN RIDLON, CHICAGO, ILL.

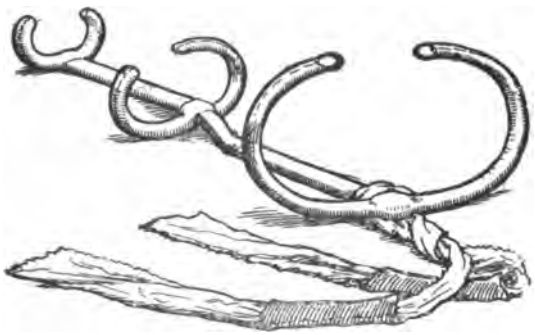
Mr. Chairman and Gentlemen:

I wish to thank you for the privilege of speaking to you for a few minutes on the subject of hip-joint disease. I realize that some of you will be compelled to treat some of these cases; and, although you may find little pleasure in it, all of you may at times see these cases. I will therefore say what I have to say, having in view what seems to me necessary for every medical man to know regarding hip disease. He should know how to diagnosticate the case in hand; he should know the principles of the treatment of such a case; and he should be able to diagnosticate the cure when the treatment has terminated. Those three things are of chief importance.

There are three symptoms that are always present in hip disease: (1) Limp; (2) muscular atrophy—that is, shrinking of all of the muscles that control the motion of the hip-joint; (3) and restriction to the natural motions of the joint. There is restriction to motion in every direction, not in one direction simply, but in every direction; abduction, adduction, rotation, flexion and extension. These three symptoms are always present, and they may be the only symptoms present.

The other symptoms that are usually present, some of them, or all of them, are: Restlessness in sleep, or crying out or screaming out, or shrieking in sleep. This restlessness comes on during the first part of the night, as a rule, when the child is first going to sleep, or during the first two or three hours of sleep. But this symptom may be absent.

Deformity is almost always present; but it may be absent if the patient has been under treatment. Cases that have not been treated always have a certain amount of deformity. The first deformity that appears is flexion of the thigh on pelvis; usually associated with a certain amount af abduction and outward rotation. When the thigh has become flexed to from

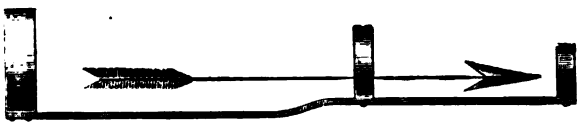


From a photograph of a Thomas Hip-splint. Cut shows a broad strip of bandaging looped around the main stem and twisted ready to carry over the shoulders to be fastened in the holes at the ends of the chest-band. Soft leather sheathes have been slipped over each end of the bandage to a point where the bandage passes over the top of the shoulder.

twenty-five to forty degrees, the abduction and outward rotation as a rule disappear, and the leg passes into adduction and inward rotation; although occasionally a case, perhaps one case in fifty, will persist in having the leg abducted and rotated outward when flexion has passed this point, but this deformity in a late stage of the disease is rare, usually the leg passes into adduction and inward rotation. and the flexion increases up to fifty or sixty, sometimes even ninety degrees. In connection with this deformity of flexion and lateral deviation there is usually some shortening; either true shortening or false shortening, and usually both. The true shortening is due to destruc-

tion of the head of the thigh bone, or of the upper margin of the acetabulum, or to the lack of growth of the diseased member. The false shortening is due to the flexion and adduction. If the leg is abducted it apparently lengthens the limb; in other words, gives a false lengthening; so that a leg may be truly shortened and may be abducted enough to compensate for the true shortening, and made to appear to be as long, or maybe longer, than the other leg. On the other hand, the leg may not be truly shortened at all, but in case of flexion and adduction it may appear to be anywhere from an inch to two or three inches short. The deformity of flexion, with or without one or the other of the lateral deformities, is a very constant symptom.

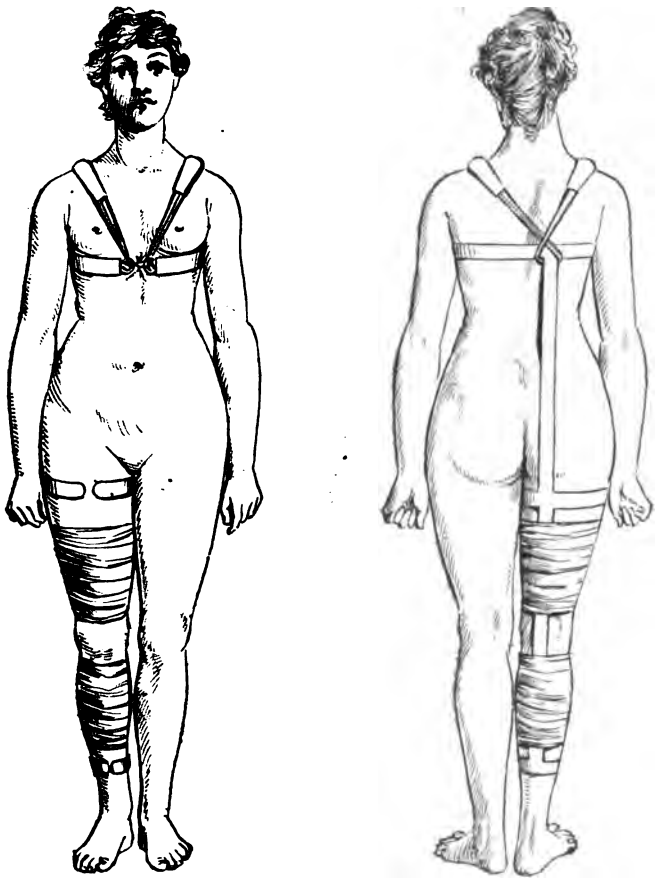
There is usually some sensitiveness of the joint: that is, the patient complains or evinces evident hurt when the joint is gently manipulated. There is sometimes tenderness to pressure, to a moderate gentle pressure, either about the great trochanter or back of the great trochanter along the neck and up towards the head of the bone. I never attempt to use violence in these cases. I never test for tenderness by forcibly striking



A diagmatic outline of the Thomas Hip-splint, illustrating the parallelism between the leg portion and the body portion of the main stem.

the great trochanter or by holding the leg stiff at the knee and hammering on the heel, as it was at one time thought necessary to do to make a diagnosis. A diagnosis should be made without using any force at all. It is possible to make the diagnosis of hip disease long before any sensitiveness is apparent to striking upon the great trochanter or against the heel of a stiff leg.

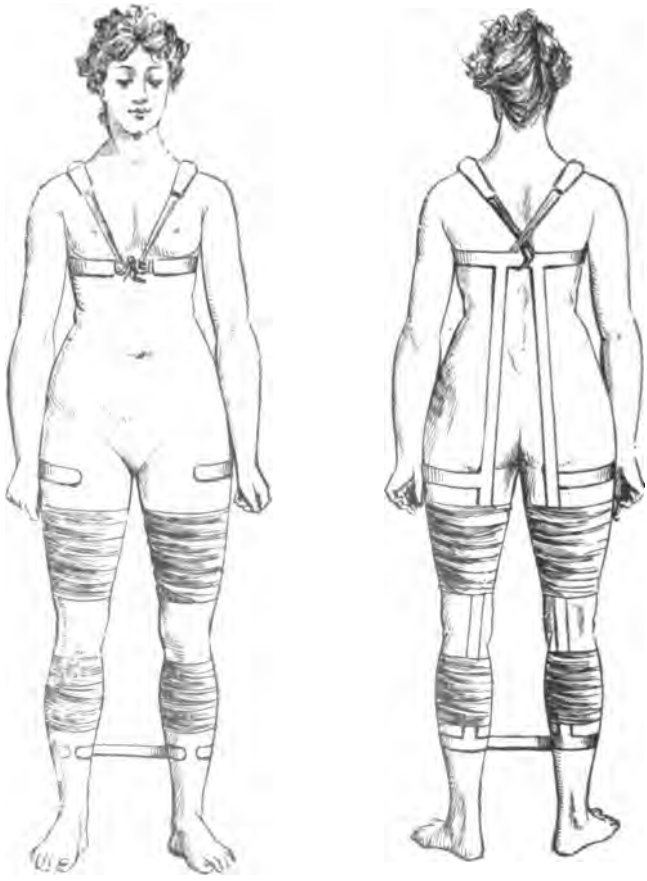
Pain is a pretty constant symptom. It comes on fairly early in many cases, and stays a longer or a shorter time. But it is not by any means the first symptom, and usually a diagnosis can be made anywhere from three to six months before any pain is complained of. The pain usually passes off any-



Front and rear views of the Thomas Hip-splint applied. In some instances the splint is bandaged to the lower extremity as shown in the illustration. At other times the knee alone is covered by a figure-of-eight bandage, and still at other times, in very sensitive cases, the bandage is carried from the leg-band to the hip-band, covering the whole of the lower extremity between these bands. It will be noted that the chest-band passes around at about the level of the lower angle of the scapula, and in the female, be. below the breasts. The thigh band passes around the limb well up to the perineum. The leg band may be anywhere between the ankle and the middle of the calf. The main stem passes down over the lower angle of the scapula, back of the neck of the femur, in some instances, and in other instances back of the joint itself, and thence down back of the medium line of the leg.

where from six months to two years before the joint is well. So that pain is not to be relied on as a symptom of the disease. I have seen a case of hip disease go through a period of four

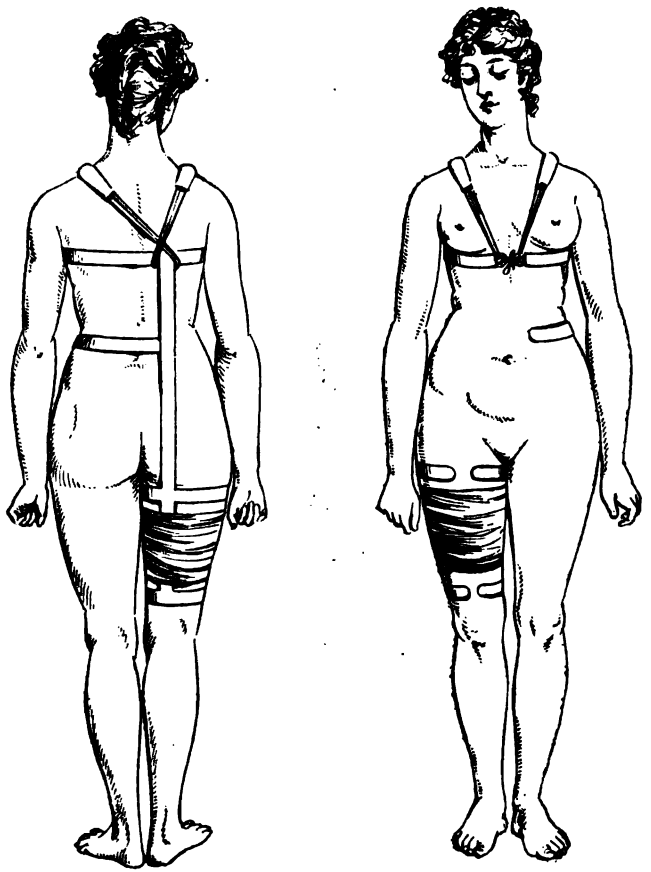
years without treatment, resulting in absolute stiffness of the joint, so that no motion was possible; considerable deformity and the formation of an abscess, and never have had a moment's



Shows the double Hip-splint which is used in all cases of bi-lateral hip disease, and in extremely sensitive cases of uni-lateral disease. It will be noted that the inner wings of the thigh-bands are omitted.

pain or evinced the least bit of tenderness of the joint. Pain, therefore, is not a constant symptom. When pain is present, it is usually felt at the knee and at the inner side of the knee, sometimes in the groin, and about the hip; but usually the pain of hip disease is at the knee.

Abscess occurs in about 50 per cent. of the cases of hip disease. It usually first shows itself in front of the joint, a



Shows the short Thomas Hip-splint. It is made in the same way as the long splint with the exception that it is cut off just above the knee. This splint is usually worn during the convalescent period of the disease. It shows also a band around the waist to counteract abduction. This band may be applied, and often is, to the long splint during the early stages of the disease. When it is wished to counteract adduction, this band is placed on the opposite side.

little below and to the inner side of the anterior superior spine of the ilium. Usually, at first, there is a little fulness, or the groin looks not so well marked as the other side; usually the

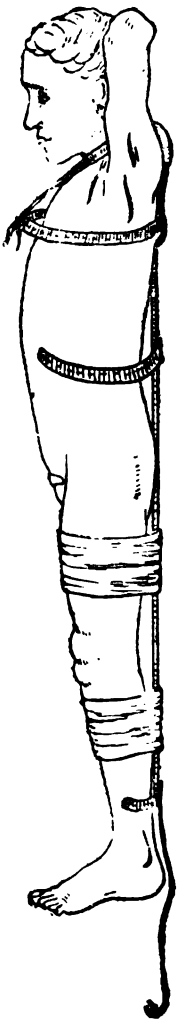
superficial veins show a little larger on that side. After a few weeks the thickening increases, and after a time it is possible to find an area of fluctuation of an inch or two in diameter; the tubercular pus coming through between the two strong bands of the Y-ligament of the hip-joint. The next most frequent place for the abscess to form is back of the great trochanter under the buttock. Occasionally it makes its way inside the pelvis. At one time we believed that all these cases that showed abscess in the iliac fossa, inside the pelvis, had perforated the acetabulum. Now we know that these abscesses are found in hip disease without perforation of the acetabulum and that they make their way through the natural openings of the pelvis and follow down the course of an ordinary psoas abscess to the inner and anterior portion of the thigh. So that an abscess found within the pelvis in hip disease does not necessarily mean a perforation of the acetabulum. The course of the abscess is very slow. It usually covers a period of three to eighteen months, if left alone, from the time it can be made out up to the time it opens and evacuates itself. Sometimes more than one abscess forms; but as a rule there is only one abscess, and it usually forms as suggested, below the anterior superior spine of the ilium and passes down upon the upper and anterior portion of the thigh, opening anywhere near the junction of the middle and upper third of the thigh.

Occasionally we find subluxation in hip disease. In cases where there are abscesses, and also in cases where there has never been any evidence of abscess, the thigh becomes dislocated, and usually dislocated in the ordinary position of a traumatic dislocation; in other words, upward and backward on the dorsum of the ilium.

Occasionally there is separation of the epiphysis of the femur. But this is a very rare condition in my experience.

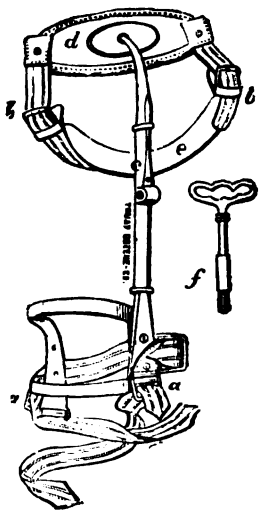
The three symptoms that are to be relied upon as always present are: First, the limp—which is the first symptom to come on and the last to disappear, and may stay even all through life. The next symptom is that of the shrinking of the muscles of the thigh, and the muscles of the thigh may shrink so that the thigh is an inch less in circumference

before any limp has appeared, and before the person is laid up in bed, or seriously inconvenienced. This is a constant symptom and one upon which the differential diagnosis materially hangs. The last is restriction to motion in all directions and is, in the early part of the disease, the conclusive factor upon which we make our diagnosis. The motion is restricted by a peculiar involuntary muscular spasm. The joint moves through a certain arc to a certain point perfectly, freely, and without any discomfort, if gently and carefully handled. Then it is suddenly stopped; stopped by a sensation to the examiner quite different from anything else that I know of. It is a sensation that cannot be well described, but which when once felt will always be recognized. It is not the sudden stop which comes when a joint is restricted either by a bony protuberance or by ligamentous restriction bands; neither is it the slow restriction that comes when the joint is voluntarily restricted as a patient may restrict it when the joint hurts or when he does not wish to allow full motion, as will a child. Such a restriction is yielding, and is not certain and always fixed at one point; on the other hand, the restriction due to involuntary muscular spasm always stops at one and the same point. Upon this symptom of involuntary muscular restriction and upon this alone is it possible to make the diagnosis absolutely certain. If there is restriction in motion in one direction only, or two or three directions, then it is not hip disease. There must be restriction to motion in flexion; there must be restriction to motion in extension; restriction to abduction and adduc-



Shows the Thomas Hip-splint with a middle wing to counteract abduction; also with a strip of iron screwed to the bottom of the splint and extending some distance below the foot. This piece is called a "nurse," and is used in the case of small children to prevent their getting out of bed and walking about when they are alone.

tion and to rotation. Usually restriction to extension is greater than that to flexion. Usually the restriction to outward rotation is greater than that to inward rotation. But this is not certain. In abduction, adduction and rotation, the restrictions are usually better marked than in flexion. But one must have restriction to motion in every direction to make sure the diagnosis of hip disease.



Shows the original Sayre short splint. This form of splint is no longer in use. Dr. Sayre still uses the short splint with a long hip-band and two perineal straps. It does not immobilize the knee, nor completely immobilize the hip-joint.

The conditions which must be differentiated from hip disease are lumbar spondylitis, congenital dislocation and hysterical joint. Lumbar spondylitis is a disease which, before there appears any deformity in the spine, very closely imitates hip disease in the attitude of the patient. The patient stands with the affected limb slightly advanced, with the thigh slightly flexed on the pelvis, with the leg abducted and slightly rotated out. Motion in the direction of extension and in the direction of inward rotation is restricted and the joint may be held perfectly stiff in some sensitive and anxious children who have suffered much pain. But in a healthy hip-joint, if the patient rests on his back at ease, and in that condition the hip-joint be

flexed to a right angle, so the psoas muscle is relaxed, rotation will be normal; and normal motion can only be in a healthy hip-joint. With the psoas muscle relaxed, if the disease be in the lumbar spine, all the motions of the hip-joint are normal; and none are restricted except extension and inward rotation, or the motions that put the psoas muscle on the stretch. The lumbar spine, examined as to flexion, forward flexion and backward flexion and lateral bending, will be found to be stiff in lumbar spondylitis; and in a case where there is any question about it in the mind of the surgeon whether it is the hip-joint or not, the lumbar spine should always be tested. If there is normal motion in the lumbar spine, in forward bending and backward bending, and lateral bending, then the lumbar spine is not diseased. If there is normal motion in the hip-joint in one or two or three directions, then the hip-joint is not diseased.

The next condition that is likely to be confused with hip-disease is sacro-iliac disease. In this country this is comparatively a rare condition. In France it occurs frequently among young adults, especially young men, and those that are taken from their homes and put into the cavalry, and made to undergo the severe training of the cavalry soldiery. Sacro-iliac disease, without disease elsewhere, is a disease of adult life. It is very rare in children. Disease of the sacro-iliac joint in children is usually associated with lower lumbar spondylitis; at least the fifth, and, at times, the third and fourth, lumbar vertebræ are also diseased in all, or nearly all, of these cases. In sacro-iliac disease the diagnosis is sometimes difficult. If the part is exceedingly sensitive, and pain very great, the patient may hold the lumbar-spine stiff, and he may hold the hip-joint stiff, and it may be difficult to make a diagnosis at the first examination. In the majority of cases, by careful handling, the surgeon will be able to find that the lumbar spine, under certain conditions, has free motion. That excludes disease in the lumbar region. Under equally favorable conditions, he will find that the hip-joint has free motion in some or all directions. Then the diagnosis of sacro-iliac disease can be pretty certainly made. Sacro-iliac disease is often very obscure for a long time. This joint has practically no normal motion. It has no true synovial mem-

brane; it has synovial tissue, but that is located in the inner portion of the joint; that is to say, the part of the joint next to the pelvic cavity, rather than on the superficial surface, so that, usually, sacro-iliac disease exists for some time within the pelvis before any swelling or tenderness is felt over the sacro iliac joint.

Shows the long Sayre Hip-splint with abduction attachment at the junction of the main stem with the hip-band.

All suspected cases of sacro-iliac disease should be examined by the rectum, because in such cases it is possible to find swelling or tenderness internally long before it shows externally.

Congenital dislocation at the hip ought not, as one would suppose, to be mistaken for hip disease. Nevertheless, it at times is. Congenital dislocation of the hip is often-times not noticed until the child begins to walk, and sometimes not until

it has walked for some time, but it is always noticed in the early part of childhood. In congenital dislocation of the hip where only one side is affected, the patient walks with a limp; the leg is shorter than the other. There is prominence over the dorsum of the ilium, and the perineum is broader on that side than on the other. Usually the buttock is somewhat flattened and broader on that side. Motions of the hip-joint are normal in all directions except abduction and outward rotation. In other words, in congenital dislocation of the hip, the dislocation is usually in the same direction as the traumatic dislocation, upward and backward on the dorsum of the ilium, and motion is free in every direction except that which throws the head of the thigh-bone against the dorsum of the ilium. There have been three cases reported where the dislocation was upward, or upward and forward, but they are so infrequent that the condition is not worth consideration.

The other condition which often does puzzle the surgeon in the diagnosing of hip disease, is the hysterical hip-joint. The hysterical condition will imitate, so far as I know, almost anything; and it may resemble hip-joint disease very closely; so closely, that almost any man may be pardoned for falling into error. The joint may be deformed or not; but it will be held stiff. There appears to be a muscular spasm, which closely resembles the spasm of true hip disease. But in hysterical-joint disease there is never, so far as I know, any muscular shrinking. The thigh on the affected side, even after the patient has been in bed two or three, or even four years, will be just as plump and well-nourished, and give the same measurement, as the thigh of the unsuspected side; and it is the question then of muscular atrophy that makes it important to measure all these cases, and is the main point of differential diagnosis in the hysterical condition at the hip-joint.

The principles of treatment of hip disease are to obtain functional rest for the joint. Functional rest of the joint tells the whole story; and it is only a question of how best one can obtain the functional rest. The hip-joint is constructed to have motion and to bear weight; to rest that joint, one must prevent motion and relieve the joint from weight-bearing. To immo-

bilize the hip-joint, one must immobilize the area covered by the muscles which give motion to the hip-joint. In other words, some of the muscles that help to move the hip-joint pass below the knee, and the knee, therefore, must be immobilized.

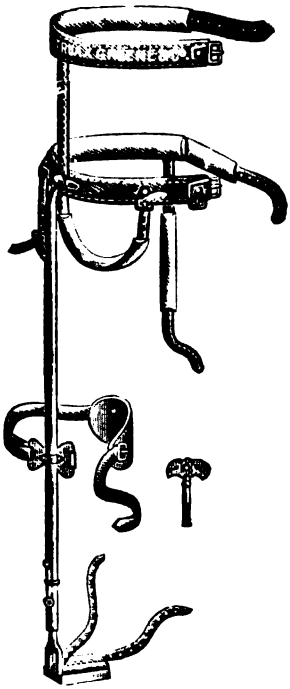
Shows the Shaffer Hip-splint, which aims to give continuous traction and diminish the shock of concussion in walking, through the coiled wire spring round the main stem. This splint is expensive, gets readily out of order, and has few, if any, practical advantages over any of the long traction splints, and is now rarely used.

The psoas muscle is inserted as high up as the last dorsal vertebra; it flexes the thigh, and rotates it outward. One must, therefore, control motion as high up as the last dorsal vertebra. Whatever form of splint be chosen for a case of hip disease, if it is the aim to immobilize the joint, the splint must extend from somewhere near the ankle, as high as the arm-pits. Any other splint, which terminates at the waist, or below the crest of the ilium, as most of the traction splints do terminate, fails to immobilize as perfectly as we would like to

have it. Hip splints, which consist of a band going around the pelvis above the great trochanter and below the crest of the ilium, where the top portion of most of the traction hip-splints, such as the Taylor splint, terminate, allow motion to thirty-three or thirty-five degrees at the hip-joint; and this is more motion than a tender and sensitive hip will tolerate. The splint which is most frequently at hand, and which many will feel safer in using than any other, is the plaster-of-Paris splint. The plaster-of-Paris splint, if applied in hip disease, should reach from the ankle to the arm-pits, and it should be put on the leg in the straightest possible position. It is very difficult to satisfactorily apply it. If the patient lies on his back, more flexion of the thigh on the pelvis will result than is wished—more flexion than is necessary. If you turn the patient over, with his face down, and hold him up, one person holding him by the heels and another by the arms, the unnecessary flexion is avoided, but lordosis of the lumbar spine results. The patient may be suspended as recommended by Bartow, of Buffalo, who puts on a plaster splint with the patient standing with the well foot on a stool, and the other one dangling; but in that position there is also a greater amount of flexion than one would wish. It is a splint which will serve very well if the deformity is not very great, and, if carefully put on, will do very well. The chief objection to the plaster splint, in my mind, is, that it must be taken off and replaced at least every month or two; and many times one cannot make a plaster splint last as long as a couple of months, or even a month. Every time this changing is done, traumatism will be inflicted on the hip, and it may do a great deal of harm.

The next simple splint for immobilization is the Thomas. It consists of an iron band going around the chest below the level of the scapula, another band around the thigh, and another around the ankle, and these all joined together by a heavy, flat bar of iron, sufficiently strong that the patient cannot bend it. It passes down the back from the lower angle of the scapula, back of the hip-joint, and lies in a crease which it will make in the buttock, and then passes down the back of the thigh and leg. With the patient firmly attached to it, it is possible

to get good immobilization. The reason, in so simple a splint, is, that the hip tends toward flexion only, and if it is held bound fast in full extension, there is no tendency to motion. The hip does not incline to move laterally, or backward; it only inclines to bend forward. If, then, it be bound to a posterior bar, so



Shows Ridlon's long Traction splint. The advantage of this splint is that it can be applied to any case of hip disease without regard to the degree of deformity, either in flexion or abduction. It gives as perfect immobilization as any long traction splint can when the main stem is placed at the side of the limb. By the bolt, which joins the hip-band, the main stem and side bar of the body portion, adjustment at any angle can be made.

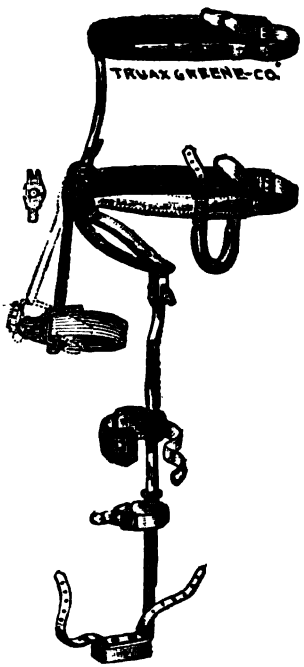
that it can not bend forward, it is, for all practical purposes, perfectly immobilized. These two splints are the only splints that I know of, that aim simply at immobilization.

The next point to look for in the treatment of the case is the removal of the superincumbent weight from the joint; in other words, the saving of the hip-joint from the traumatism of

locomotion. This may be done with certainty only by putting the patient in bed, or by putting him on crutches, with a high shoe, so that he can not get the toe to the ground. The only safe way is in bed. Bed treatment can be carried out for a few weeks, or, at most, for a few months, and since the patient must be under treatment for several years, some device must be employed that shall protect the joint when the patient is up and walking around. With the plaster-of-Paris immobilization splint, or with the Thomas hip-splint, it is customary to put on a shoe, raised from four to six inches from the ground, on the well limb, and give the patient axillary crutches; the joint is then protected from weight and concussion in walking. If the patient is not old enough to be trusted in these, one must use some other sort of splint. The other splints are the traction splints, which pass below the foot like the Taylor, the Judson, the Phelps, the Sayre, and the splint which goes by my name. They are arranged so that the patient may not bring the whole of the foot to the ground in walking. Of these I may speak a little further in discussing the question of relief from the pressure arising from the involuntary muscular spasm.

Hip disease has in this country been treated for thirty or thirty-five years by most medical men by a traction hip-splint. The traction hip-splint was first applied with the idea that the joint surfaces could be pulled apart, and kept apart, while motion was going on. Henry G. Davis, the father of the traction hip-splint, believed that it was possible to have motion at the hip-joint without friction. This is a manifest absurdity, and the traction splint is now used, not for the purpose of pulling the head of the thigh bone from the acetabulum, but for the sake of counteracting the muscular spasm which forces the head of the thigh bone into the acetabulum, and for the purpose of making a perineal crutch, so the leg cannot come down and receive a shock during locomotion. These traction splints do act to immobilize the joint to a certain extent. This traction device does immobilize the joint, but does not perfectly do so; and action of these splints is now generally admitted to be useful only in the way of protecting the leg from shock in walking, and for giving a little relief to painful spasms in a few cases. That which most

perfectly immobilizes the hip-joint most quickly allays the muscular spasm, and in the majority of cases simple immobilization is all that is necessary to relieve this muscular spasm. In a few cases the traction causes pain and increases muscular spasm, but in a larger number of cases the traction does re-



Shows the Phelp's Hip-splint. This splint gives better immobilization than any of the other long traction hip-splints, but it cannot be applied to a case until all deformity, flexion, abduction and adduction, has been corrected. It has an attachment for outward, lateral traction which, in the opinion of the writer, is of no avail except as an added means of fixation.

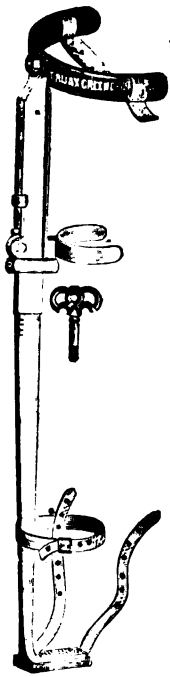
lieve the painful spasm for a period, and, during that period, it should be used. In other words, if you have a patient whose hip is most comfortable when it is simply held still, give him simply immobilization. If you have a patient who is more comfortable when his leg is pulled upon by your hand, by all means give him a traction apparatus. If you have a patient where pulling causes pain, by all means don't give him traction. In

other words, do not follow any man's line of treatment, but treat the case on its individual merits, and do that which will most quickly give the patient freedom from pain, freedom from suffering, and which will most quickly allay the spasm which locks the joint. That treatment will be the treatment; and no one can give more excellent advice by saying what brace or what form of treatment may be applied to any individual case than to tell you to do that which will most quickly relieve the suffering on the part of the patient.

The indications for operating in hip disease: I think I am not mistaken in saying that the more cases of hip disease the general surgeon operates upon, the less inclined he is to operate; and I am sure I am right in saying that the orthopedic surgeon believes that operation is very rarely called for in hip disease. A careful study of the statistics of Professor Sayre practically tells the whole story of excision in hip disease.

The more experience a man has in excision of the hip-joint the less inclined he is to operate—if he is an honest man. If he operates upon a patient, and when the wound heals up sends him away cured and never sees him again, either wilfully or carelessly, he will be satisfied to go on operating; but if he sees the patient in a year, or in two years, or three or four years, he will see a good many relapses. Generally speaking, that has been the experience of George Arthur Wright, of Manchester, England, who has probably excised more hip-joints early in the disease than any one else. Excision of the hip-joint, or operative measures upon the hip-joint, in my opinion, is only called for as a life-saving measure. When a patient has had the benefit of complete immobilization of the hip-joint as can be given by means of fixation and traction; when he has had the benefit of rest in bed to protect the limb from injury from jaring in getting about; when he has had all this done, and has had the best hygenic and medical care, and still steadily grows worse, then operation is called for, and only then, in my opinion, is it called for; and you will only meet about one case in three or four hundred of hip disease that reaches the point where, under these conditions, operation is demanded.

The question of operation upon the abscess is a subject which I think we will differ about very materially. In my opinion, if one can open the abscess and evacuate it, and can close it up without drainage, and have it remain closed, operation on that case is called for, if one is willing to take the extra risk of tubercular meningitis. But it is very seldom pos-



Shows the Judson Hip-splint. A very strong and useful appliance, especially in convalescent cases.

sible to do all this, and unless it is possible so to do, I believe that the operation will do harm rather than good, in a great number of cases. My experience with simple aspiration has not been satisfactory. The abscess usually refills. My experience with aspiration and injection of the 10 per cent. mixture of iodoform has not been satisfactory. About one third of the cases that are aspirated and injected with the iodoform are benefited by the procedure; about one-third are not benefited, are

not influenced by the proceeding, and about one-third are made worse by the operation. Further than that, most of the cases of hip disease that one has to do with are in children, and the operation is so painful that the surgeon's life becomes a burden if he is at all sensitive to the complaints and cries of the children during the whole period of the months and the years that the child must be under treatment, and the little gain that is had from the pain inflicted is not worth the while. Incision and evacuation and closing the abscess cavity, may be justified; but incision and drainage with a rubber tube, as is customary, is, in my judgment, never justified. The rubber tube always makes a sinus that is slow of healing and difficult to deal with. I am accustomed to leave these tubercular abscesses alone so long as the patient's health is in a reasonably good condition. If he is suffering from fever. if he has lost appetite, if he is growing thin or falling off greatly, if he is perspiring profusely and losing ground, then, of course, operation is indicated. But if the patient has good health and has no fever, I leave the abscess alone, and I leave it to open spontaneously. I am sure from the number of cases I have treated, it is safer to do that way. One may lose one's surgical fee, but I believe it is better for the patient. I restrict these operative measures in hip disease to life-saving measures, and believe that operations in hip disease are only justified when it is necessary to do them to save the patient's life. A hip-joint excised with the best possible result is not nearly so good as the worst result that can be obtained by mechanical means.

The last point to which I wish to speak to you is the question of diagnosing the cure. Discredit often comes to a conscientious man simply because he is unable to diagnosticate the cure. When the pain has ceased, when the joint is no longer sensitive, when the patient seems to be well, and is willing to run about upon the joint, many men are satisfied to call the case cured, and discharge the patient. If this is done, there generally will be relapses, relapses to the surgeon's discredit. How, then, shall one tell when a case is cured? After all pain has gone, and night-cries, and after all sensitiveness to gentle manipulation has disappeared; after all the abscesses, either

opened or unopened, have healed; after the muscular spasm has ceased; when all these have been absent for some three to six months, then one may think the case is well. But it is not wise to say so. The patient then may be given a little more liberty, may sleep without the brace, but not walk without it; a period of three months may go on under very careful observation. If the symptoms do not return then, the surgeon may say to the patient that he rather thinks the joint is pretty nearly well. Don't make it any stronger than that. Then the apparatus may be taken off, and the patient may use the joint. If there is any motion in the joint, and the joint is well, the motion will increase; if it is diseased, the motion will become less. If there is no motion in the joint when the patient is cured, and the joint be used, if the joint is well there will be no change; if the

Shows one of a pair of Triple Action Ratchet Wrenches for bending the Thomas Hip splint, or any splint having a leather covering over a metal base.

joint is diseased, deformity will increase, flexion will come on with abduction or adduction. When the surgeon discharges the case as cured, or when he thinks the case cured, he should carefully make a record of the amount of motion at the joint, and also the degree of deformity, if there be any. Then when the patient uses the limb, the surgeon can compare that record with the later records. If the joint is well, no symptoms will return; if the joint is diseased, restriction to motion or increase of deformity should give ample warning before any pain is felt, or any great damage has been done. Then the treatment must be resumed. This, gentlemen, then, is the only test of a cure in hip disease: the use of the joint under careful observation on the part of the surgeon. The patient must walk on it, and use it; if it stays well, or gains more motion, it is well; if it gets stiffer

or more deformed, it is not well; without regard to whether it hurts the patient, or whether there is any pain, or any other symptom.

DISCUSSION.

DR. GRANT: The paper which we have listened to is one of very much interest to all medical men—to the practitioner as well as to the surgeon, for he often sees the case before the surgeon does, and is called upon to make his diagnosis. Yet, notwithstanding the very clear and elaborate statement which can be found in a great many of our standard text books, journals, lectures, and papers of excellent men, as to symptoms and diagnosis, it is a fact that this diagnosis is often not readily made. I have seen in the last year two cases, one with a fatal result, and another with ankylosis of the hip-joint, and the patient treated the whole time for rheumatism. I was called to perform an operation for uterine trouble, and she told me something of having rheumatism in her hip. I made a thorough examination, gave ether for the operation, finding ankylosis of the hip-joint. She said she had been treated for rheumatism, although she was confined to bed three months and suppurating during the time. That patient is now living, and is enjoying good health here in Denver.

I have listened with very much interest to the statement of the author of the paper as to the treatment of this disease. It was my pleasure a few years ago to listen to the most interesting series of lectures that I have ever heard, upon this subject before the Royal College of Surgeons, of London, by Mr. Marsh, who was in charge of the Alexandria Hospital, of London. He took a very strong ground against the ordinary resection of the hip-joint at any stage. I made it my interest and pleasure to investigate the matter among the surgeons of London to know their estimate of these lectures and the position taken by Dr. Marsh. The lectures were all published in the London *Lancet* six or seven years ago. The point most insisted upon in the discussion was the amount of shortening and the future use of the limb by the respective methods of treatment; one by doing nothing, and the other by resection, Mr. Marsh claiming that the shortening would be less by his method.

I need hardly say that the surgeons there preferred as to fixation dressing, the Thomas splint. That is the one generally used in London by the surgeons; but the point under discussion was not so much as to the life of the patient. It is my recollection that these gentlemen all conceded that the operative treatment offered the quickest cure; that by resection and drainage, the patient would get well quicker. But the main question with these surgeons was, which gave ultimately the best result as to length of limb and use; and that was the question debated by these gentlemen with the greatest interest.

But the question of evacuating the pus was also decided. The conclusion was, of even Dr. Marsh himself, that it took longer to effect a cure without operative treatment, but there would not be so much shortening; and if this is true it is a great point in its favor although it does take a greater length of time.

As to opening the abscess, he does not use drainage, but it was his rule to make the smallest incision possible to let it out. Generally he did not use drainage at all. In this way he claimed the most excellent results.

As to the existence of pus, a surgeon should regard it as an important principle to do what nature is attempting to do—let it out.

There is one method of fixation which Dr. Ridlon has not alluded to. I wish to speak of it; I use it in preference to plaster-of-Paris. It is silicate of soda solution. I have a patient with it now. I have had the pleasure of comparing it with the plaster-of-Paris dressing, and it is very much lighter dressing. It is easy to apply and to remove, although it does take longer to dry. A patient will be very much more comfortable with it, and especially when you have reached the stage where the patient is permitted to get up and go about. It is a clean, neat and effective dressing, and will stay on as long as you want it—for months. I am thoroughly satisfied that this material ought to be more popular as a fixation dressing than it is.

DR. PACKARD: I wish to refer to one point Dr. Ridlon has brought out in his paper, viz: the diagnosis of a cure. It is not an unusual thing, in my experience, to have students and others

ask how we know when a patient with hip-joint disease is cured, or if the disease is still progressiug. Acute symptoms, such as pain and tenderness, if present, usually disappear many months before the joiut is cured, and consequently we are to judge the case entirely by the objective symptoms. Dr. Ridlon has given some very valuable rules to guide us in deciding this point.

Dr. Leonard Freeman: I have listened with much interest to the paper of Dr. Ridlon, and I certainly hesitate to differ with so high an authority. But there is one point I do not exactly comprehend, about the question of abscesses. Tubercular abscesses, and I presume when he speaks of abscesses in hip-joint disease he means these, are not apt to give rise to fever in themselves. It is only through secondary infection that much fever occurs. When, in a case of abscess in connection with hip-joint disease, there is much fever, with sweats, chills, etc, as the doctor has mentioned, one would suppose that secondary infection had already occurred; and if this were the case, there would seem to be every reason why such an abscess should be opened at once. There are several indications for opening a tubercular abscess. In the first place, if there is any pain, or if there are symptoms of pressure, an opening would be required. In the next place, if the abscess were about to break through the skin, it seems more advisable to open it aseptically, rather than to allow it to open itself, and become infected, as such infection leads rapidly to hectic fever and other complications. I agree that the abscess should be left alone as far as possible, but there seems to be conditions, as I have mentioned, which call for an incision with aseptic precaution.

Dr. Whitehead: I have listened with interest to Dr. Ridlon's paper, a part of which, only, I heard read; especially that part in which he speaks of extension. The Doctor said something to this effect: That, provided extension caused no particular pain to the patient, to use it. Am I right, sir?

Dr. Ridlon: I said that if the traction gave comfort, use it; if it gave pain, not to use it; if it gave neither pain nor comfort, leave it alone.

DR. WHITEHEAD: That is, in substance, what I understand the gentleman to mean; but he does not tell us how that extension should be made to avoid pain, and to procure comfort to the patient. This is the most essential point in the proper treatment of hip-joint disease by extension.

I shall take exception to some two or three points in his paper; one of them, concerning the opening of abscesses, in this disease. I know personally, from experience, of a number of cases in this city, that there is great advantage to the sufferer from hip-joint disease in the opening of an abscess caused by it; and this independent of a resort to excision, if the openings are rightly made, with a large counter opening to drain off, fully and readily, all the pus; and, if suitable, after-treatment with balsam peru; and finally, after some days, iodoform dressings to hermetically seal the wounds. Unfortunately, these abscesses are liable sometimes to recur, especially in scrofulous subjects. Indeed, recently I opened, with the best results, an abscess about the hip in a patient on whom, about ten years ago, I excised four and a quarter inches of bone, for hip-joint disease. This case was published, with others, about that time, in the *Medical Record*, and was one that offered, I believe, as fine results, as regards a minimum of shortening, and satisfactory motion at the hip, as can be shown.

I will return to the question of extension. Since I have been in Colorado, I have had more practical experience in hip-joint disease than I formerly had. When I was a youngster, I studied attentively the work of Sir Benjamin Brodie, and that of Bonnet, of Lyons; they are excellent treatises on this disease. But, until I got hold of Sayre's work, I did not thoroughly appreciate all the points of treatment dependent upon a successful use of extension at this joint. I never attained to a real practical knowledge of these things until I thoroughly understood Sayre's method of examination, and of extension in a case of hip-joint disease. If you have a case of hip-joint disease, and are going to make an extension, for instance, in the proper way (and Dr. Ridlon, I hope, will agree with me that there is a proper way to make this extension, especially when you have a young patient with this painful disease, and it is desired to

move that patient about, and without discomfort to him, or, at least, with as little pain as possible), make your traction of the diseased limb "*in the line of the deformity*," as Sayre has so usefully pointed out; and which *principle of treatment* is so essential to comfortable and painless traction, and by which means we can satisfactorily prepare the patient for the serviceable use of an extension brace. Read attentively what this great orthopedic surgeon has to say about the right manner of making traction, if you would successfully treat a case of hip-joint disease.

[The President interrupts the speaker with the announcement that the five minutes have expired. Upon the speaker asking the indulgence of the meeting for a few minutes more, the same is refused, the President announcing that the discussions necessarily must be limited to five minutes for each speaker.]

DR. RIDLON: I quite agree with one of the speakers, that the tubercular abscess is usually an aseptic abscess, and, generally speaking, should be left alone. When there is fever, and septic symptoms, it then, of course, should be opened. There is no question about that. I don't see any object in opening it when it is near the surface, simply because it is near the surface; and I think his statement an unfair one, or at least, a delusive one, in saying if it was opened and treated aseptically, it would remain aseptic, and if it be allowed to break it would become infected. My experience is, that if it is opened and treated aseptically, as most surgeons treat it, it will become septic, and when it is allowed to break, and is treated carelessly, it will rarely or never become septic. So I allow mine to break.

As to the question of time, of which Dr. Grant spoke, it was believed that by operation the time could be shortened; but the case related by Dr. Whitehead is perfectly in accordance with the cases seen by every man who waits for years to find a relapse. Mr. Battle, of London, and his associate recently have reported some fifty cases, and gave the duration in detail following the operation. Taking into account the time required for operation and subsequent brace support, the duration of treat-

ment was little, if any, less than the average time for the cure of cases by medicinal treatment alone.

As to the cases referred to in the Alexandria Hospital, in London, formerly under Marsh, and under Bolby now, in which the investigations were carried on; it is all true that was said: but another factor should be taken into consideration. It was said by Dr. Grant that the London patients were generally treated with the Thomas hip-splint. I think I know the Thomas splint. I think I have been a closer student of Thomas's work, both in his office and elsewhere, than any other one in this country, and I think I know the work of all the London orthopedic men, and I think I am not over-stating it when I say there is not one orthopedic surgeon in London, or that there was not, five years ago, one orthopedic surgeon in London who knew how to construct or apply the Thomas instrument. Consequently, the Thomas splint is not to be taken into account in considering their cases. They do not know how to use the splint.

SURGICAL TECHNIQUE.

A Clinical Lecture at St. Luke's Hospital, Denver, Colorado.

CLAYTON PARKHILL, M. D., DENVER, COLO.

I fancy that it will be conceded, gentlemen, that the great difference between the surgery of twenty years ago and the surgery of to-day is in the matter of technique. The older surgeons were, doubtless, quite as skilful operators as those of the present day, yet their results were not as good. Their wounds became infected, and their patients suffered all the dangers of prolonged suppuration, septicæmia, pyæmia, gangrene, erysipelas, etc. The technique of the modern surgeon destroys the disease germs when present, and prevents their entrance when not present, and saves the patient from these dangers and sufferings. It is an easy matter to roll the sonorous terms, asepsis and antisepsis, under the tongue, and to say that all the precautions

have been taken in a certain operation, when, as a matter of fact, the technique has been anything but perfect. In other words, I consider it an extremely difficult matter to present a technique which is beyond criticism.

I have asked you to come up here to see an abdominal section, not that I expected to show you anything new or novel in the operation for the removal of diseased ovaries and tubes, but that I might exhibit to you the technique which I follow in this hospital. I will pass over the medical preparation, and deal only with the surgical aspect. The preparation for the operation was begun yesterday afternoon, at which time the pubes were shaved, and the entire abdomen thoroughly scrubbed with soap and water. It was then scrubbed with 1-1000 acid solution of bi-chloride of mercury, after which, towels wrung out of this solution were bound upon the abdomen, and left until this time. While the patient is being anæsthetized, let us examine the preparation of all things which are expected to come into contact with her in the operation. The instruments have been boiled for ten minutes in a solution of bi-carbonate of soda, under pressure, after which they were transferred to the basins, and placed in a steril-normal salt solution.

We use, for sutures and ligatures, silkworm-gut, silk and catgut. The silkworm-gut is usually boiled with the instruments. The silk is sterilized by boiling in pure water, as the soda solution destroys its strength. The catgut is washed in ether, and kept immersed in ether for twenty-four hours. It is then placed in a solution of 1-1000 bi-chloride of mercury in alcohol, and in this is sterilized by boiling. Any one of these may be needed in each abdominal case; consequently, they are all prepared. The dressings, sponges (by the way, I only use gauze sponges), sheets and towels have all been sterilized in an Arnold steam sterilizer. In a case which is not already infected, we use only what is known as the normal salt solution; that is, a solution of chloride of sodium in water, having a strength of 6-10 of 1 per cent. This we sterilize, by the fractional method, in flasks having a capacity of one gallon. There has been, until recently, however, a break in the technique when it came to getting the solution out of the flask—the mouth of the flask was

not sterile. I have devised a circular alcohol lamp, which I show you here, which, when placed around the mouth of the flask, discharges a flame in every direction towards the center. This direct heat sterilizes the lips of the flask, and burns away the top of the cotton. When that has been done, you may be sure that there will be no contamination of the fluid as it is discharged.

The preparation of my assistant and myself is in the following manner: You will observe that I say assistant, because more than one assistant in the ordinary abdominal section is superfluous, and the greater the number of hands coming in contact with the patient, or any of the appliances used in the operation, the greater will be the danger of infection. We have operating suits made of wash material. After each operation they are laundried, and placed in a solution of 1-1000 of bi-chloride of mercury, after which they are rough-dried. They are then rolled inside-out by a nurse with sterile hands, and placed in a sterile receptacle until needed at the time of operation. We begin the preparation of our hands by scrubbing the nails, subungual spaces and finger-tips with soap and a good bristle brush. When the nails have been thoroughly softened and cleansed by this process, they are dried, and with a sharp knife they are pared and scraped, both underneath and above until they are free from any foreign material or dead tissue. We then return to the soap and brush, and the nails, hands and forearms to the elbow are thoroughly scrubbed for a period of about ten minutes. They are then immersed in a solution of 1-1000 bi-chloride, and kept there for a period of two or three minutes. After that, the bi-chloride solution is washed away so that none of the mercurial may by any possibility enter the abdominal cavity.

The patient now being under the anæsthetic, my assistant will prepare the abdomen after the nurse has removed the dressings applied yesterday. It is scrubbed with soap and water and a stiff brush. You might ask me, what is the necessity for this repetition of scrubbing. My theory is, that the application of the moist antiseptic towels for twenty-four hours softens the superficial layer of the epidermis, so that the scrubbing com-

pletely removes it. It has been shown in bacteriological laboratories that germs lie underneath the superficial epithelium. The abdomen is now washed with a bi-chloride solution of 1-1000 and afterwards with normal salt solution in order to remove any trace of the bi-chloride which might remain.

I have put my instruments in two basins and these have been placed on two arms of the instrument-holder, which is attached to the table opposite to the patient's hip. In one basin are the sutures and ligatures with the instruments which will be needed in connection with them, and in the other basin the instruments which I will need in the operation. In the third basin is placed the sponges, and this is located on another arm of the instrument-holder. I devised this instrument-holder several years ago. It has three movable arms arranged in such a way that my instruments are always before my eyes, and nobody touches them but myself. The sutures and ligatures are managed by the operating room nurse, who stands just to my right on the opposite side of the table and can see precisely what I want. The sponges are placed convenient to my assistant's hand as he stands on the opposite side of the table. This device, I believe, reduces to a minimum the handling of instruments, sutures, ligatures and sponges.

While my assistant is repeating the preparation of his hands I will surround the area of operation with sterilized towels. All being ready, we will now begin the operation. Our first incision carries us through the skin, the superficial tissue and the muscles. It is not only unnecessary in my opinion, but it is bad practice to dissect up, layer by layer, seeking for the linea alba; I go through all the structures with a clean incision, whether it strikes the linea alba or not. We now pick up the transversalis fascia with two pairs of forceps and divide it. We next pick up the peritoneum and open it in the same manner with scissors and prolong the incision in the peritoneum and transversalis fascia to correspond with the external incision. The right ovary, you will observe, is cystic and utterly destroyed so far as any function is concerned. We will ligate it with its corresponding tube and remove it. The left ovary, as you see, is also diseased, so we will remove that. I have

used silk ligatures and touched the stumps with a Pacquelin cautery. You will observe that we surround the handle of the cautery with a sterilized sponge while we are using it. I have seen operators ruin their technique by taking hold of a cautery handle, which is never sterile. We now pass the sponge into the Douglas cul de sac and find there has been no bleeding. It is entirely unnecessary and inadvisable to irrigate an abdomen after such an operation. We will now close the wound with silk worm-gut sutures which will include all the layers of the abdominal wall. Except in very stout persons I never suture the wall by layers. In my opinion, many more cases of ventral hernia occur because the sutures are removed too early, than because the wall is not sutured layer by layer. These sutures will not be removed until the eleventh or twelfth day. We will now apply the usual dressing of gauze and cotton, held in place by adhesive strips and a many-tailed bandage, and send the patient to bed. The operation, as you will observe, has been completed in eight minutes. Time is a most important element in most operations and particularly in abdominal cases. No haste should be used, yet the operation should be completed as quickly as is consistent with care.

A case of right inguinal hernia was operated by the Halstead method to still further illustrate this technique.*

LATERAL CURVATURE OF THE SPINE.

G. B. PACKARD, M. D., DENVER, COLO.

In considering the treatment of lateral curvature of the spine, it may be well first to briefly call attention to some of the factors that are either directly or indirectly instrumental in producing this peculiar deformity. In this affection, we not only have a deviation of the spinal column to the side, but also a rotation of the vertebræ upon their vertical axes. This deformity is usually acquired, and occurs more often in girls than

*Both of these patients made excellent recoveries, being dressed but once and that on the eleventh day.

in boys. Some observers put the ratio five to one, and others place it much higher. It undoubtedly begins much earlier than is generally supposed, there being no early pathological changes, and consequently, in many cases, no early subjective symptoms, the trouble is not likely to be discovered until they approach puberty--a time, perhaps, when the form of a girl is more carefully scrutinized by the mother and the dressmaker. By the time the surgeon first sees these cases they are apt to be well-marked, and many times, beyond the state of perfect flexibility. Ketch concludes, from an analysis of cases of the New York Orthopedic Dispensary, that lateral curvature begins from the eighth to the fifteenth year. Eulenburg considers that it begins still earlier.

The most frequent variety of this curvature is where we see the convexity of the curve to the right in the dorsal region, and many times, in addition, a curve to the left in the lumbar region. In this variety the left shoulder is depressed, the right shoulder-blade is more prominent and higher, and further from the median line; the left hip is frequently higher, the left breast more prominent, and the whole trunk may lean to the right. This description might be considered to represent a typical case of lateral curvature of the spine; in other words, the cases we most often meet. It is quite probable that the frequency of this variety is due to the fact that the great majority of children are right-handed. There is a difference of opinion in regard to the relative importance of these two curves, and also as to which is the primary curve when they exist together. I believe, however, that, with few exceptions, the dorsal curve is the one that demands the greatest attention, irrespective of its priority. I will not discuss all the theories of the causation of lateral curvature, but will refer to a few of the more important ones. There are some who believe at the present day that the vast majority of these cases are due to unequal muscular action, but there is no evidence that the muscles are weaker on one side than on the other, or that there is any undue muscular contraction on one side early in the curvature, for, when the patient is recumbent in the early stage, the curve disappears. Still others believe in the osseous theory, or the

abnormal growth of one side of the vertebræ and ribs, but the fallacy of this theory is also proved by the disappearance of the curvature by suspension or recumbency during the early stage. The theory that is most generally accepted at the present time, and the one that certainly seems the most plausible, to explain the vast majority of cases, is as follows: The superincumbent weight falling upon a spinal column that is frequently held in faulty positions either from diminished muscular tone, habit, occupation, or carelessness. This, I believe, is a proper basis for our treatment. We have then to contend with a general condition that is below par, frequently a depressed state of the nervous system, and a condition of the muscles, ligaments and bones that is less resistant than normal—a condition frequently seen in rapidly growing children. Added to these indirect factors, we must also contend with other causes, which are more direct or exciting, viz: anything that disturbs the equilibrium of the spine, such as faulty attitude from muscular weakness, or from any cause. Basing our treatment, then: in the great majority of cases, upon the latter theory, viz: of superincumbent weight falling upon a weakened spine, the first indication would be to remove the superincumbent weight; this, however, is impracticable except for a limited portion of the time. Recumbency for a long period of time can not be recommended in these cases, on account of its debilitating effects. I do, however, advise many of these patients to rest in the recumbent position about two hours daily; this, I believe, is not debilitating, but rather adds to the nervous strength. The general health should be very carefully watched, and everything done to improve the general tone of the patient. I think this important measure is frequently neglected. Since residing in this altitude, I have seen the curve apparently arrested several times by the general improvement brought about by a temporary sojourn in a lower altitude. The improvement in these rapidly growing children, who are frequently anæmic and poorly nourished, is very noticeable after such a change, and is due, probably, to the fact that the waste process is somewhat retarded by the change. To still further strengthen the spinal column and the muscles of the back, and thus prevent the spine from being

held in a faulty position, gymnastic exercises are very important. Mr. Roth, of London, has called attention to the great benefit to be derived from this method of treatment, and has described a variety of exercises that are now found in many of our text books. One of his rules, which is important, is, that every individual, when performing these gymnastic exercises, shall assume a position as correct as possible. This he calls the keynote position, and his idea is that the exercise should be such as to strengthen the muscles involved in maintaining this attitude. They should also be taught to walk and sit erect, and make an effort to keep the spine in a correct position at all times. In addition to these exercises and postures the patient should be encouraged to write with the left hand, especially upon a blackboard hung high upon the wall, in order that it may be necessary to reach as high as possible with the left arm. In this way they not only use the muscles of the left side, but also help to correct the curve. The benefit derived from these measures will depend in a great measure upon the individual effort made in each case, and it is necessary that the exercises should be under the supervision of the surgeon and not left to be carried out in the gymnasium. It is also a good plan to suspend the patient and at the same time make pressure over the convexity of the curve by the hand, and try to undo the deformity temporarily as much as possible during each office visit, and direct that it be carried out at home daily in addition to the usual exercises. This treatment, thoroughly carried out, is frequently sufficient in the milder cases to arrest the trouble. But such cases should be kept under observation for a long time, as there is danger of the deformity progressing, and other means may be required to arrest its progress if possible. In more severe cases or when they grow progressingly worse in spite of the treatment referred to, and also where the deformity is well marked, with resulting pain and disability, it becomes necessary to use some support to prevent these faulty positions, and if possible to correct the curvature and relieve the pain.

To show that there is some misapprehension in the minds of many of the profession in regard to the mechanical treatment of this affection, I will quote the following from Dr.

Sayre in a recent article on this subject. He says, "Although I have written repeatedly and at length on the different modes of applying plaster of Paris in the treatment of Potts' disease and lateral curvature, it seems to me from the papers I read in the various medical journals, that a number of physicians are under the erroneous impression that I use gymnastic exercises in cases of Potts' disease, an l employ immovable plaster jackets in cases of lateral curvature, etc., etc. I wish to raise my voice in emphatic protest against what many gentlemen seem to regard as my method of treatment in lateral curvature—namely, placing the patient in a plaster jacket and leaving him there for a number of months, and then removing the jacket and replacing it by a second."

It is important that our mechanical appliances should be constructed in such a way that they can be easily removed for the purpose of gymnastic exercises; also at night when the patient is recumbent, and in some of the earlier cases where they are advised, I think they should be constructed in addition, to not interfere with the action of the muscles or motion of the trunk, as far as possible. It should be remembered that the various appliances weaken the muscles of the back to a certain extent, and are only to be used when the exigencies of the case demand it—to prevent increase of the deformity. If it is found that the curve is increasing in the early stages in spite of gymnastic exercises, and especially if pain be present due, very likely, to pressure upon the nerve roots, I think an immovable cast for a few weeks is beneficial. The relief from pain is generally marked, and the patient will gain, consequently, in a general way. This treatment, however, must not be prolonged beyond a few weeks on account of its tendency to weaken the muscular support of the back. In other early cases, where pain is not so prominent, but curvature increasing, I prefer the use of a light steel appliance, especially the one devised by Dr. Shaffer, of New York. It acts on the principle of lateral leverage, and it consists of a steel band around the waist, with a joint in the back and front. On the side of the projection an upright is attached to the band, with a pad, for pressure, over the convexity of the curve. On the side of the concavity an

upright extends from band to axilla and acts as a crutch to elevate the depressed shoulder, and held in position by the straps passing to the pad over the convexity. Upon either side, arms extend down a few inches from this band in front and behind, the ends of which are joined by a buckle and strap, which pass around the side of the pelvis. Tightening the strap on the side of the projection will produce pressure over the convexity of the curve, and not only act as a reminder to the patient to keep erect, but also will correct the curvature to a certain degree, when flexible. Tightening the strap on the side of the concavity will produce a slight counter-pressure at a point a little higher and on the opposite side from the main curvature. I think this appliance also prevents swaying of the trunk to one side. Another great advantage of this apparatus in these early cases is that it does not interfere as much with the motion of the trunk or action of the muscles, and consequently is not as weakening as a corset; it is, therefore, especially adapted to the early cases that can not be trusted without some support. In cases that are further advanced, and where the curve is partially fixed, my preference is a removable jacket, and, in most cases the plaster of Paris is preferable; although felt, paper, wood or leather can be used. The felt and leather, I think, are inferior, the wood is better, but much more trouble to make, and more expensive. The principle, however, is the same, and any of them will serve the purpose of holding the spine in the improved position that may be obtained by suspension, manipulation and other methods of correction. In regard to methods for reducing these curves where they are well-developed, Lorenz has shown that properly applied pressure over the projection will improve these cases if carried out daily. He advises twisting the patient daily over a padded bar, where it is not permanently fixed, for several weeks. The rotation is partially overcome by standing erect as possible or bending the spine backwards and throwing the weight upon the posterior portion of the spinal column, therefore, anything that increases the backward flexibility of the spine is advisable. A great deal can also be done by daily suspension coupled with manual force—that is, pressing the spine into shape with the hands

during suspension. Any improvement that can be obtained in this way should be followed up by a new cast in the improved position. A useful way of carrying out this principle is to apply a jacket as suggested by Drs. Lovett and Bartow, of Boston. The jacket is applied as usual; it is then cut off and a cast of the patient made from this shell. The lateral projections of the cast are now partially removed by a knife, and a new jacket made over the modified cast, which is a little straighter than the body of the patient. It is provided with lacings and can be removed during the night, and for exercises. Of course, the patient will complain if the pressure is very great, but will become accustomed to a reasonable amount, and the results are quite satisfactory. It must not be forgotten that in these cases where appliances can not be dispensed with, their use must be supplemented with the gymnastic exercises.

The time required in the treatment of these cases will vary according to their character; but, with the exception of the milder ones, they should be kept under observation during their growth, although active measures may not be required during the whole of this period.

DISCUSSION.

DR. RIDLON: I will detain you just for a minute. I once made a mistake in lateral curvature of the spine, and I am always glad to tell it; it may happen to you some day. One naturally looks upon a case of lateral curvature as simply a spine curved to one side, and any spine curved to one side may be assumed to be a lateral curvature. A man may be justified in forgetting that in Potts' disease, spinal caries, oftentimes, in the beginning of the disease, there is a lateral curvature of the spine.

As to the treatment of Potts' disease, and a true lateral curvature: In lateral curvature there must be exercise; in Potts' disease, rest. Then, it is important to make a distinction between it and caries. If, then, a little girl presents, with the lateral curvature in a proper region, between the shoulder-blades, with the convexity of the curve in a proper direction, to the right, it would be excusable to assume that it was a case of

lateral curvature, and start in with the exercise. I had just that theory, and just such a case. The case grew rapidly worse. The spine grew rapidly stiffer, which ought not to have been, under that treatment. I took the hint, and investigated more carefully, and found that it was a case of spinal caries. How shall one make the diagnosis, and not conflict spinal caries with simply a lateral curve? I only know how to make a diagnosis in this way: Lateral curvature slowly becomes stiff; if the case has had a duration of three or four years, then one is entitled to have a stiff case of lateral curvature. Potts' disease, spondylitis, grows stiff rapidly. If the disease has gone on for only a few months, and the spine is stiff, it is Potts' disease, and not lateral curvature. The history of the case must be weighed with the degree of rigidity, to safely diagnosticate between the lateral curvature and Potts' disease, and a true lateral curvature.

DR. WHITEHEAD: It is a pleasing duty to notice Dr. Packard's paper; I shall strictly confine my time to the five minutes.

I was much interested in the gentleman's remarks; in fact, they cover pretty much all that we need to say about the general features of this disease.

I thought it proper on one occasion to resort to tenotomy in this affection. My success in facilitating the extension of the spine justified the operation.

The practice of orthopedic surgery has become so much of a mechanical affair—has been so much relegated to the instrument maker, that necessary operative measures are often neglected, or not appreciated.

I prefer a properly-adjusted plaster-of-Paris jacket, that can be laced up, taken off for exercise of the muscles, and reapplied, as the most suitable appliance for use in this disease.

CIRCUMCISION.

S. D. VAN METER, M. D., DENVER, COLO.

As this simple operation is one of the oldest, if not the oldest, on record, we would naturally suppose all questions relative

thereto had been settled long ago, and the profession was a unit as to its merits, method of execution, etc. But it is not so, or else it would be presumption on my part to consume any of this society's time with a paper on so simple a surgical procedure.

A number of the medical profession take the stand that it is only a few cases that require circumcision, and if it can be avoided, it is better, as the Creator placed the prepuce over the glans to protect the sensitive nerve-endings, and its ablation is interfering with Nature. At first sight, this argument against circumcision appears difficult of rebuttal, it being impossible to say why man should be born with a foreskin if it is unnecessary. But of those who are satisfied with this argument I would ask, if they hold the same opinion in regard to that troublesome appendix vermiformis? The fact remains, that the removal of the prepuce is never followed by any evil results, and in many cases circumcision is essential to the restoration and preservation of health. It must be admitted, there are a number of children and adults who do not require circumcision, but it would have done them no injury, had they had the operation performed in early infancy. Personally, I am firmly convinced that all male children would be better off if circumcised soon after birth. If the operation were fraught with danger, locally or constitutionally, would not the Jewish race, with their proverbial shrewdness, have discovered it centuries ago? Most assuredly, yes; and why any one should maintain that the operation can do harm, is hard to understand.

On the other hand, it is difficult to estimate the good done by circumcision. I have no more patience with those who advocate it for every reflex neurosis, from epilepsy down, than with the "orificial" surgeons, who look to divulsion of the sphincter ani, as a panacea for all the ills that human flesh is heir to. However, in any case of reflex neurosis, where you have an adherent prepuce or phimosis, it is not only right to perform circumcision, with the expectation of its doing good, but wrong to withhold the operation. But do not operate with the idea that the phimosis is the cause of the neurosis. In most cases, you will only be removing a point of irritation to an already bankrupt nervous system, and must only expect an

amount of benefit proportionate to the irritation removed. That an adherent prepuce can be a great source of irritation to the general nervous system, can not be gainsaid. I have seen too many cases of night terrors in children completely cured by circumcision, when all other treatment had failed, the operation having removed the cause—the adherent prepuce.

In such cases, the foreskin does not act as a shield to the sensitive nerve-endings, but by retaining smegma and decomposed urine, it keeps the whole glans in a constant state of irritation. Such a state causes hyper-sensitiveness, and increases the chances of the child becoming a masturbator.

Without going into the history of circumcision, it is safe to say the unprejudiced reader of the Scriptures will naturally come to the conclusion that the most natural origin of the operation was the discovery of its value from the standpoint of cleanliness and hygiene, by the Hebrews; and to make it universal among that people, it was embodied in the Mosaic law as a religious rite. Too much can not be said in its favor in regard to cleanliness, and it is impossible to estimate the good done, when we take into consideration its effect upon the prevention and decrease of venereal disease. Here the effects are too far-reaching to ascertain, and we can only surmise. That a circumcised man is less liable to contract venereal diseases than one who is not, can not be questioned; and any one who has treated many venereal patients must admit that these cases are greatly simplified if they have been circumcised.

In this day, when the brilliant and triumphant successes in visceral surgery have attracted so much attention, the technique of minor surgery is apt to be neglected, and many surgeons have apparently forgotten or disregarded the fact, that. for continued success, certain points of technique must be observed, even in the simplest of operations. This is true as regards circumcision. I have seen good surgeons fail altogether, simply because they paid no attention to one or two points necessary for success. Time after time I have heard the question asked: "Why do you have recurrence of phimosis so frequently after circumcision?" If the operation is properly performed, recurrence is impossible. Hence, it must follow, many circumcisions

are improperly done. Strange to say, but few text-books give a clear and full description of the operation. The most complete and lucid is that in *Wyeth's Surgery*. Having performed the operation many times, with universal success, after a method similar to this author, permit me to describe the operation:

Presupposing the patient anæsthetised and prepared for operation, the parts are disinfected as well as can be with bichlorid, solution 1-2000. Hands and instruments of operator and assistant, if there be one, are likewise rendered surgically clean. Allow the prepuce to assume a natural position. With a camel's-hair brush, dampened with methylene blue, draw a line around the penis, corresponding to the corona. Draw the prepuce well forward and cut it off with sharp scissors, in the line marked with brush. Although it may appear you are cutting the integument at right angles with the penis, when it is released it will be found that the integument has been cut upwards and backwards, giving a large opening for the glans to pass through. The loose connective tissue between the skin and body of the penis now permits the former to be drawn far back from corona, leaving a large, raw surface. With the mucous membrane, however, it is different, as generally it will be found it has been cut off at a point sufficient to expose about one-third of the glans. By passing a grooved director between the glans and mucous membrane, incise the latter on the dorsum with a bistoury to a point near the corona, or, what I like better, slit it up with a blunt-pointed pair of scissors. Care must be taken that your instrument is not in the meatus. This permits full exposure of the glans, although it is astonishing in how many cases from 1 to 10 years of age, it will be found that the prepuce is adherent to the glans, and has to be gently separated, and, at best, leaves more or less of the surface of the glans denuded. In this procedure, the blunt point of a grooved director and a peeling motion of the thumbs and index fingers are useful. Now comes a step in the operation which is the keynote to success—*the trimming of the mucous membrane.* There being no elasticity of this tissue, the operator can at will fix the length of the prepuce, and if it be made short enough, recurrence of phimosis is impossible. With forceps and

scissors cut it off, leaving a fringe of uniform width from the corona, of one-eighth to one-quarter of an inch, according to age and size of patient. If the artery of the frenum has not been severed there will be but little hemorrhage, but if there should be, the hand of the assistant can easily control it by grasping the penis near the base. After irrigating the wound with bi-chlorid solution, the edges of the integument and mucous membrane are united by a continuous lace cat-gut suture, beginning at the frenum, previously fixing the skin and mucoua membrane on the dorsum opposite frenum with a hæmostat, to prevent getting too much tissue on either side. When the hæmostat is reached with the suture, take a reverse stitch or two to prevent purse-string action. This method of suture secures rapid and accurate apposition, and the cat-gut is absorbed by the time union takes place. The parts are now once more cleansed with the bi-chlorid solution, and dusted well with iodoform, and, in adults, a gauze and cotton dressing is applied, leaving free the meatus to permit voidance of urine, without disturbance of the dressing. In young children, however, the best dressing is none at all, as you can not expect any antiseptic dressing to remain so, and the most satisfactory protection from the clothing is a large piece of oil silk, lubricated with carbolized vaseline. Usually within twenty-four hours the iodoform has formed a hard crust over the line of suture and denuded portions of glans, under which the healing process goes on by first intention. If not, however, an occasional bathing of the parts with warm antiseptic solutions prevents any undue suppuration or sepsis.

To prevent erections, which often thwart union by first intention, full doses of potassium bromid are given.

If the advocates of divulsion, incision and other substitutes for circumsion, would try this operation, they would be convinced that it is simple, always effective, and not to be equaled by any other.

The question of anæsthesia I decide as follows: Infants, none; children, preferably chloroform; adults, ether. My experience with cocain has been unsatisfactory, and, while in

cases where a general anæsthetic is contra-indicated it can be used with great advantage, my preference is for ether.

There are many other points connected with circumcision I would like to touch upon if time permitted; but, before closing, will say, in cases of chancroid, where this operation is indicated, after due precaution, I do not hesitate to operate, and contrary to many surgeons' experience, have always had good results.

CANCER OF THE RECTUM.

Its Excision After the Method of Kraske and Modifications Thereof, With a Report of Cases.

CHARLES A. POWERS, M. D., DENVER, COLO.

The older methods of excising the rectum have been in large part superseded by the sacral procedure, and it is safe to assert that of all malignant growths affecting this part of the body, but a small proportion will be found amenable to cure when dealt with from the perinæum.

Although Kocher of Bern had for some years added to the posterior incision a removal of the coccyx, it remained for Kraske of Freiburg to lay down these fundamental rules, which, though since modified from time to time, enable us to cope with something like an assurance of success with this distressing affection.

It was before the German Surgical Congress of 1885, that Kraske first proposed to gain easy access to the upper portion of the rectum by resection of the lower part of the sacrum. This original procedure has since undergone important modifications. Its essential details are as follows:

The patient lies on the right side, somewhat in the Sims' position, the thighs and legs flexed and a stout support raising the pelvis. A cut is made from the left border of the sacrum, opposite its second vertebra, to the anus; this cut quickly curves to the midline at its upper end, and reaches the posterior surface of the sacrum and coccyx. The coccyx is removed, the left lateral sacral ligaments severed, and the sacrum chiseled across

obliquely from a point opposite its third foramen on the left side to the lower right-hand corner. The severed piece is removed, the bleeding checked, and the tissues divided in the midline until the posterior surface of the rectum is reached. The anus is freed and the rectum loosened, chiefly by blunt dissection from below upward, to a point well above the growth. The peritoneum is opened, the rectum drawn down, cut off, the remaining end brought out below the cut surface of the sacrum and stitched to the adjoining skin.

The peritoneal pouch is occluded by a plug of iodoform gauze and the entire open wound filled with the same. Healing takes place by granulation and a sacral anus results.

Valuable as was this procedure in the efficacy with which a high-lying cancer could be reached, it left much to be desired, and various improvements in technique were set forth as different operators gained experience. Schede, instead of plugging the peritoneal pouch, sewed it up as soon as the rectum had been drawn down and before it had been severed, and when the anus was not involved he united the cut end of the rectum to it, thus restoring the continuity of the canal and giving the control of a sphincter. In practice it was found that the passage of fæces tore out the stitches, prevented union, and a fæcal fistula generally resulted. To obviate this Schede did an inguinal colotomy at the time of, or directly after, the operation. This not only added to the time occupied by the serious major procedure but left the lower bowel filled, and it has now been superseded by the colotomy being done so long prior to the proctectomy as to allow of firm fixation of the gut in the inguinal region, and a fairly thorough cleansing of the rectum itself. This preliminary colotomy may be considered indispensable whenever it is desired to preserve the sphincter ani and do an immediate anastomosis.

With a view to avoiding a loss of the resected bone and the consequent weakening of the pelvic floor, Levy, in 1889, devised an osteoplastic procedure whereby a flap of bone, together with the overlying soft parts, is turned up and replaced. He made a transverse cut, some four inches long, across the sacrum at its lower end. Lateral cuts are made from the ends of this through

the glutæus maximus muscle; the anterior and posterior sacro-sciatic ligaments are divided, the bone chiseled across, and with an elevator the connective tissue on the anterior surface of the sacrum is separated. The skin-flap with the attached bone is then turned down, and the rectum comes into view. This is resected, the cut ends united, the bone-flap replaced and sutured, the horizontal incision closed, the lateral ones united in part and well drained. While this is in theory a suitable procedure, it is in fact difficult to perform and unsatisfactory in results, and it remained for Rehn and Rydygier to devise a procedure which seems, thus far, to give the greatest promise. In this an incision is made from the posterior inferior spine of the ilium to a point midway between the anus and the coccyx. This is met by a transverse cut across the sacrum at the point at which it is intended to divide that bone. The left sacral ligaments are divided, the bone cut across, the bone-flap turned over to the right side, the rectum excised and sutured in the usual manner and the bone-flap returned and sewed in place. Gauze drainage is provided and the skin wound closed in part. Exfoliation of the bone rarely occurs, and even though this should take place nothing will have been lost by the attempt at osseous repair. The results in typical cases are all that can be desired so far as concerns the immediate condition. The retained sphincter insures the nearest approach to a normal bowel condition, and the pelvic floor is left intact. In those cases in which the anus is involved it is needless to say that this is impracticable. Here the gut must be fastened to the skin. In many cases control of fæces and gas will be improved by twisting the lower end of the rectum, as advised by Gersuny. In every case the inguinal anus should be closed in the usual manner so soon as the rectal condition may warrant.

Whatever the procedure employed, sacral resection of the rectum can but be considered as belonging to the severer operations in surgery. It may be easy or difficult to perform.

When the growth is small and the tissues about the rectum free from infiltration, a blunt dissection may be made with the loss of but little blood. If, however, the peri-rectal tissue be

involved a wide dissection must be carried out and the operation may be long and bloody.

Oozing from the cut surface of the sacrum can be checked by gauze tamponade; all bleeding vessels must be quickly caught and tied. At all times intelligent retraction and active assistance are of the greatest value. It is all-important that the loss of blood be the least possible, hemorrhage being the greatest factor in the production of shock.

In nearly every instance the peritoneum must be opened to allow a drawing down of the gut. This adds but little to the danger of the procedure, and an immediate suture can quickly be made.

The sigmoid flexure must be detached from the surface of the sacrum to allow a drawing down of the upper segment.

In cases in which four inches or more of the rectum have been resected, it is necessary to loosen it very thoroughly from the sacrum in order to approximate the cut ends without traction. This loosening is accomplished in part by dividing the mesentery, and in part by blunt stripping up. It is not infrequently necessary to ligate the superior hæmorrhoidal artery on either side, and in such cases Kammerer has proposed to cut away still more of the rectum and bring down a portion better supplied by other branches of the inferior mesenteric in order to do away with the possibility of an anæmic necrosis of the lower end of the gut.

The approximation must be made without tension, for the blood supply is poor at best and the bowel is without the peritoneal investment which is so great a factor in prompt healing.

In those cases, however, in which there is no tension, good blood supply and a diversion of the fæces through a previously made inguinal anus, primary union will be found the rule rather than the exception.

In certain cases the surgeon will find it necessary to content himself with a partial operation and to postpone completion until a subsequent sitting. So, when the amount of blood lost has been considerable, the shock severe, as in patients who presented a previously weakened condition, one may be obliged to hastily tack the bowel posteriorly, plug the peritoneal open-

ing and tampon the entire wound. The operation is a severe one, frequently bloody and tedious. The writer fails to understand Bardenheuer's assertion that he completes the procedure in fifteen or twenty minutes, stripping up the rectum by blunt dissection and often finding it unnecessary to open the peritoneal cavity. If amputation be made and a sacral anus established, it may be possible to avoid opening the peritoneum. Rarely can this be done, however, when the bowel ends are united.

While the mortality attending this operation has steadily diminished, it is yet considerable. From the data at hand I judge it to be, in the hands of competent operators, about 20 per cent. The chief causes of death are shock, hemorrhage and exhaustion; peritonitis I believe to occur but seldom and sepsis should be infrequent. Drainage is easily made and should be liberal. A caution may be made regarding the too free use of iodoform gauze; the surface left is large and quickly absorbs. I have myself seen iodoform intoxication, very quickly disappearing, however, on removing the drug.

My cases are as follows:

CASE I.—Cancer of rectum, Kraske's operation. Death from acute anæmia and shock.

Miss K., aged 27 years, single, was transferred to my service at St. Luke's Hospital, New York, July 25, 1893, by my colleague, Dr. Robt. Abbe, who was about leaving town for the summer. No previous history bearing on the present condition. Three months before seen she had commenced to suffer with obstinate constipation from which she had previously been free. Fæcal movements were narrow and painful, but not bloody. The patient had lost thirty pounds in weight and much strength during the past three months; her general condition was fairly good; pulse 86, temperature 99°.

The examining finger introduced into the rectum revealed an annular, irregularly nodular mass extending three inches above the anus. The constriction admitted the tip of the index finger, which could be swept about and over the tumor. On vaginal examination the mass was felt to push the posterior

vaginal wall forward, but not to involve it. The lymphatics in the immediate neighborhood were enlarged.

Eight days were occupied in putting the patient in the best possible condition, and on August 3 the following operation was made: Ether—six-inch incision over sacrum and coccyx to anus; coccyx and lower segment of sacrum removed (Kraske). Anus and lower part of the rectum freed from surrounding tissues. Dissection difficult and bloody owing to fairly extensive peri-rectal infiltration. Cancerous mass found to extend well up anteriorly. Peritoneum opened, meso-rectum severed, rectum drawn down and cut off, stump brought out beneath cut surface of sacrum and sutured to skin. Peritoneal opening plugged with iodoform gauze, wound filled with boro-salicylic gauze. The operation lasted two hours and the patient lost a considerable amount of blood. Vessels were clamped as soon as seen, but there was a continuous general oozing which could only be controlled by pressure. At the close of the operation the pulse ran from 140 to 160. An infusion of salt solution reduced it to 120; in spite, however, of active stimulation, and further infusion, the patient sank progressively and died thirty-six hours after the operation. A microscopic examination of the tumor showed it to be carcinoma.

I am now convinced that this growth was too extensive for removal. This was not understood until the rectum was exposed. I should have done better had I contented myself with a proctotomy above the tumor, or, better, done an inguinal colotomy at a subsequent time. In this connection the following may be of interest:

Case: Mrs. D., a woman of about 40 years was referred to my service at the New York Cancer Hospital October 1, 1893, by my colleague, Dr. H. C. Coe. For six months she had suffered with painful, bloody stools, steadily diminishing in size. Examination revealed a nodular mass encircling the rectum about two inches above the anus. The finger passed through this. High infiltration was not felt per vaginam. October 11, Kraske's operation was performed. On opening the peritoneum the infiltration was felt to extend too high to warrant attempt at removal. Peritoneum closed and wound packed. The pa-

tient made a smooth convalescence and was advised to have an inguinal colotomy made whenever the symptoms should demand it. In April, 1894, she was in good general condition. I have not heard from her since.

CASE II.—Cancer of the rectum. Kraske's operation. Recovery. Freedom from relapse at end of twenty months.

Mrs. F., aged 35 years, was referred to my service at the Cancer Hospital Sept. 28, 1893, by Dr. F. A. Manning. For six months she had observed a mucous and bloody discharge with rectal pain. The stools had diminished in size; on examination a hard, nodular mass was found to encircle and constrict the gut just above the anus. Operation—October 9, 1893, Sacral Resection. Peritoneum opened, mass found to extend one inch above the recto-peritoneal margin and to involve the anus. Rectum amputated above growth and upper end fixed beneath sacrum. Wound packed with iodoform gauze. Slight iodoform intoxication which disappeared on change of dressing. Undisturbed convalescence. The patient regained good control of fæces but not of gas. I learned of her recently. She has had no evidence of recurrence. Pathologist's report: "Carcimona."

Operation was in this instance easy. The growth was confined to the rectal wall and anus. The loss of blood was but slight. I do not think that we can determine definitely the extent of the disease prior to exploration. We cannot make sure in an individual case that the operation will be accomplished rapidly and easily. We must in all instances be prepared for a long and difficult procedure.

CASE III.—S. M., a man of fifty-two years was admitted to my service at the Cancer Hospital, June 15, 1892, with a history of having had occasional bloody stools for three years, these having of late become painful. Examination revealed a tender, bleeding, granulating tumor just above the anus, through which the fingers could be passed. The anus did not seem to be involved. Operation June 30, 1892, in my absence by Dr. Van Arsdale, assistant surgeon. Sacral resection, six inches of rectum removed, end of gut drawn down and stitched posteriorly to anus. Wound packed, smooth healing. On July 18 and again on August 21, secondary operations were done to

restore the continuity of the gut. This was effected and the patient left the hospital completely healed and with control of fæces, though not of gas. Pathologist's report: "Carcinoma."

CASE IV.—Cancer of rectum. Resection. Recovery.

Mrs. R., a woman of 39 years, came to my office in February, 1894, with a history of painful defecation during the past four months. She had occasionally noticed blood in the stools and had recently "felt a lump." Examination revealed a rough, annular, friable mass just within the anus and lying rather on the anterior rectal wall. On vaginal examination it seemed limited to the lower part of the rectum.

Operation: Sacral resection, peritoneum opened and gut pulled down. A string of infiltration ran well up on the anterior wall. After removal of some five inches of the rectum, sparing the anus, the tension was so considerable that in view of the patient's general condition it was deemed unwise to prolong the operation by a high loosening of the gut. It was accordingly brought out beneath the sacrum. Undisturbed convalescence. Pathologist's report: "Carcinoma." I am unable to ascertain the present condition in this case.

All of these operations were made before I became familiar with the osteoplastic procedure of Rydygier. In a future suitable instance I should proceed, so far as present knowledge goes, after his plan. It permits of the most thorough extirpation possible with restoration of the bony parts.

Much depends on a proper selection of cases. A large proportion of patients with cancer of the rectum will be found, when first seen by the surgeon, to be in too advanced a condition to warrant thought of cure. The disease progresses slowly and often reaches an advanced stage before the increasing occlusion of the gut seriously calls the patient's attention.

The earliest possible diagnosis on the part of the family physician is of the greatest importance. These cases first come under the care of the general practitioner, and his examination should be most thorough. In no affection about the rectum should digital examination be omitted. The examining finger is of far greater value than instruments, so far as the region which lies within its reach is concerned. In case of a suspi-

cious, though indefinite ulceration, dilation of the sphincter with removal of a small piece of the tumor for microscopic examination will be found of the greatest service. So long as the patient's condition warrants we are not justified in leaving any measures undone which may aid in establishing a positive diagnosis. I have more than once called attention to the fact that age is of slight value in differentiating cancer. The age of the patient in Case I was 27 years. Cancer is not so very infrequent in patients under 30 years.

It is difficult to gain the exact mortality attending extirpation of the rectum; in general, it may be estimated at about 20 per cent. Before the introduction of the Kraske method, it was something like 50 per cent. It will, doubtless, fall materially as the selection of cases and the operator's technique further improve.

Curtis collected statistics of 420 cases from eleven clinics and found that without separating the perineal from the sacral operation, the mortality was 15.5 per cent. It is, without doubt, greater in the sacral than in the perineal, as in the former the disease requiring operation is further advanced and the procedure itself is much more severe.

As regards the chief point in any operation for malignant disease, immunity from relapse, I am unable, with the literature at my command, to give even approximate figures. Curtis, in 144 cases which had run over four years, found 21.5 per cent. of four-year cures. These were, however, both sacral and perineal operations, and more of the latter than of the former. Whatever the percentage of radical cures may be, it is sufficient to encourage surgeons in their attempt. So far as we now know, the only hope of cure in cancer lies in its early recognition and prompt and wide excision, and it is on these lines that progress must and will be made. Advance in the past ten years has been steady, and much ground has been gained. It is to be hoped that the future will give us a specific, be it in the line of serum or other therapy, against this most malign disease. At present, however, our trust must be placed in operative procedure, and in the accomplishment of lasting results, the physician and the surgeon must co-operate.

A REVIEW OF SOME INTERESTING POINTS IN SURGERY OBSERVED DURING THE SIX MONTHS ENDING JUNE 1, 1895.

EDMUND J. A. ROGERS, M. D. DENVER, COLO.

It is not my purpose to in any way summarize the work done during this period, but simply to select some of the more important cases in which there have been observed points of surgical interest. I shall omit entirely mention of many of the more important branches such as brain surgery as most of the interesting cases in this department have been reported elsewhere. I shall also not refer in any way to accident surgery, or to any of the commoner operations where there is little variation in the routine and technique of work.

All cases that are referred to were operated upon in either Arapahoe County Hospital or St. Luke's Hospital.

The limited time allowed for the paper enforces the omission of many of the more important details, but I shall try to give you those which will be of most interest to the members of the society.

I shall first speak of operations for tubercular infections of bones and joints, referring briefly to five cases in this department.

CASE I.--Miss C., aged 20, patient of Dr. Atchison of Idaho Springs, operated upon in St. Luke's Hospital on December 17, 1894. She had suffered from a diseased shoulder joint for several years. A posterior sinus existed which was found to lead into the joint cavity; the joint was opened by an anterior incision; the head of the humerus was found entirely destroyed and the shaft diseased for about three inches; the head of the scapula was also involved. All diseased bone was removed, and the soft tissues scraped; it was drained freely and dressed frequently. She remained under observation for about two weeks.

At present her arm is very useful and every movement almost completely restored.

CASE II.--Wm. McC., aged 28, operated upon at the County Hospital on March 8, 1895. He had been in the Hospital for nearly a year, and all conservative measures exhausted in hopes of relieving a painful swelling of the lower tibia and ankle joint. A small sinus led down to the internal surface of the tibia about one and one-half inches above the joint. This sinus was slightly enlarged, and on exploration, found to lead to diseased bone. With a sharp spoon the bone was dug into and the whole lower end of the central portion of the tibia found to be involved down to the joint, and a diseased area extended two or three inches up the external portion of the shaft. The joint cavity was found disorganized and all its tissues were scraped out; the diseased area became superficial on the outer side just anterior to the external malleolus, and a small incision was here made through the healthy skin to faciliate the handling of the spoon. Both malleoli appeared healthy, but the upper surface of the astragalus was diseased, and almost all the interior of that bone gouged out, but the outer shell seeming healthy, was not disturbed. All tissues that seemed diseased were removed and the surfaces cleansed. The relations of the joint and the normal position of the parts were not disturbed. Much improvement in the symptoms and general condition followed; the patient passed from my hands on May 1, but is still in the hospital with the joint in plaster and a small sinus at the old site He states that the foot and ankle feel to him to be normal and the prospects seem good for a useful foot.

CASE III.--Blanch V., aged 27, colored; operated upon at the County Hospital April 22, 1895. Symptoms about the hip-joint began eighteen months before. At the time of operation the thigh was flexed and adducted, with traces of a series of abscesses about the joint. A sinus remained opening posteriorly, which was enlarged and found to lead into the acetabulum, into which the finger could be forced. The head of the bone had been almost entirely destroyed, and the acetabulum itself slightly involved; in the cavity was quite a large piece of dead bone. Above the acetabulum the capsule was gone and the tissues so

thin that a slight incision made the whole diseased area accessible from above. All diseased bone was removed with a sharp spoon, and the sinuses down the thigh cleansed out and thoroughly drained through incisions. Extension was applied and the leg gradually brought down to its normal position. The leg is now almost straight; a small sinus still persists, but movement is free and the leg seems strong. She is not yet allowed to use the leg, but her general and local conditions are much improved.

CASE IV.—L. J. B., aged 20, operated upon at the County Hospital on March 18, 1895; had been lame one year. Formerly a patient of Dr. Packard's, who had opened an abscess in the external thigh in December last. A sinus led circuitously to the external surface of the greater trochanter. The sinus was scraped, and a direct incision made onto the trochanter. The necrosed surface was then dug into with a sharp spoon, and a diseased bone area found to extend deeply into the shaft. The deepest portion was in the direction of, and seemed to extend through, the shaft into the neck. The softened bone was removed and the cavity cleansed and temporarily drained through the direct opening. The joint was stiff at first with symptoms of synovitis, but these soon cleared up, and the result, I am informed, is very satisfactory.

I shall next briefly state some points of interest in a series of abdominal operations. Exploratory incisions without further operations were made in two cases of abdominal carcinoma in St. Luke's Hospital. Contrary to the general rule of these operations, both seemed to temporarily check the progress of the disease.

CASE V.—In the first, H., aged 50, a patient of Dr. Sewall's, who was operated upon February 27; a large carcinoma of the cardia protruded into the stomach, with several secondary growths in the omentum. The patient appeared to be more comfortable after the operation and lived for about five weeks.

CASE VI.—In the second, K., aged 39, patient of Dr. Bonney's, operated upon May 4; an enormous liver filled the whole upper abdomen with growths in the stomach, pancreas and other organs. The symptoms were said to have existed only for

about six weeks. The patient lived until June 1 without apparent increase in the tumors.

CASE VII.—On February 6, assisted by Dr. Parkhill, I operated in St. Luke's Hospital upon O. J., a young and vigorous Swede, a patient of Dr. Denison's. He had suffered with symptoms of intestinal obstruction for about a week; his condition seemed fair when seen first at about 8 P. M., but on getting him into St. Luke's Hospital symptoms of dissolution appeared and an operation was begun about midnight, four hours after first seeing him. It was found that an old adhesion united the central ileum with its mesentery, and through the small opening thus made several feet of intestine had slipped and become strangulated. The strangulation was relieved, but the patient survived the operation only about six hours.

CASE VIII.—On March 30 I was called by Dr. Rover to Mrs. E. who had quite suddenly threatened complete collapse with abdominal symptoms. The history and symptoms pointed to a ruptured extra uterine pregnancy, and she was moved to St. Luke's Hospital. As the symptoms improved, she was kept under observation. An abdominal tumor, however, remained, and an exploratory incision was made on April 18. I was assisted by Dr. Craig. The peritoneum was full of fluid blood, and a large hæmatoma inclosed the left tube and ovary. This was removed and all washed out, but no fetus was found. Convalescence was rapid and satisfactory.

In two cases I have used the Murphy button.

CASE IX.—First, at the County Hospital on April 26, I operated for Drs. McLaughlin and Crouch upon D. for chronic atonic dilatation of the stomach. His illness had been long and he had had continued convulsions with other severe symptoms. Gastrojejunostomy was performed, the lower anterior part of stomach being united with the upper jejunum. Through transitory stupidity I found much difficulty in settling on the highest available point in the jejunum and lost some time. The stomach symptoms slightly improved after the operation, but not so the general symptoms and the convulsions returned in about a week. I removed the

stitches on the eighth day, when all appeared normal and healthy. I was called on the twelfth day to find the wound open and a long loop of intestine and a large mass of omentum lying free in the dressings. This had probably occurred during a convulsion. I loosened the adhesions, returned the protruding entrails and split and re-united the walls. No harm came of the accident. The patient, however, gradually developed more marked cerebral symytoms which led to his death on the twenty-fourth day after the operation. The post-mortem performed by Dr. Freeman proved that death was due to a cerebral tumor. The button was found to have fallen back into the stomach. It was temporarily harmless there, but the question naturally arises, would it have been eventually passed? With this exception the condition in the entire abdomen was eminently satisfactory. The stomach had shrunk to about one-third its size at the time of the operation, being almost normal. The union between the stomach and jejunum was so perfect that it was difficult to believe that it had not always existed. The opening appeared from the stomach like the normal pyloris. There were no indications of peritonitis, past or present.

CASE X.—The button was also used in the case of H., aged 45, a patient of Dr. Atchison's, of Idaho Springs. He suffered from symptoms of chronic obstruction of the common bile-duct with recurrent acute attacks. Cholecystduodenostomy was performed on May 6, with the assistance of Dr. Atchison and Dr. Craig. No gall-stones were found, but the gall-bladder was filled with thickened muco-bile. Recovery was rapid and uneventful. The patient's temperature never registered as high as 99, and his old symptoms entirely disappeared with the operation. The button was passed on the thirteenth day.

In this six months I have operated four times for appendicitis –twice in children, twice in young men. Each operation had sufficient interest to justify my giving it in some detail.

CASE XI.—March 12, M. S., a boy, aged 5, a patient of Dr. Stenhaus', assisted by Dr. Bagot. He had been ill several days, the marked symptoms being rigidity of muscles over right lower abdomen, and intolerance of manipulation. The appendix was found perforated and surrounded by a small abscess

situated posteriorly in the intestinal folds. Drained for forty-eight hours. Recovery, slightly delayed by a stitch-abscess, was rapid and satisfactory.

CASE XII.—April 4, A. C., a girl, aged 9, a patient of Dr. Fisk's, who assisted in the operation. Marked symptoms, local pains, with distinct tumor. The appendix was turned upwards and inwards, the approximal two inches being quite healthy. The extremity was wrapped in the omentum, perforated, and surrounded by three or four drachms of pus. The abscess mass appeared free in the abdomen. Drained for forty-eight hours and recovery was rapid and uneventual.

CASE XIII.—March 29, at County Hospital. R. J., aged 21, transferred from the medical ward with well-marked symptoms of local peritonitis and tumor. A large abscess was situated posteriorly and the appendix had completely sloughed off. Superficially the peritoneal cavity was quite free to the extreme right. The cavity was packed and frequently washed out for some days. Recovery rapid and complete.

CASE XIV.—April 27, C. S., aged 18, patient of Dr. Axtell's. Gave history of abdominal disturbance extending over about a year. Acute exacerbation began on the 20th inst. Was first seen on the 23rd, when symptoms had abated, the only marked one being slight tenderness on right side, no tumor being perceptible. Was moved into St. Luke's Hospital, kept under observation until the 25th, when all symptoms seemed to have disappeared. About 3 P. M. on that day, during deep palpitation, something was felt to slip. At 6 P. M. he had a slight chill, and at 9 P. M. temperature was 104, pulse 120. Dr. Craig assisted in the operation which was at once performed. Tissues about the cæcum were found greatly thickened, and the ruptured abscess cavity extended upwards along the spine, apparently behind the peritoneum. What seemed to be about a pint of pus had escaped into the peritoneum. As much of the thickened tissues as possible was excised; all parts were freely irrigated with salt solution, and the lower peritoneum and the abscess cavity packed and freely drained. Recovery was very rapid and satisfactory,

except a small sinus in the direction of the abscess cavity which persisted for some weeks.

CASE XV.—In an operation for radical hernia upon J. L., aged 28, colored, at the County Hospital on April 24, the hernia-sac was found filled with the appendix and adherent omentum; the cæcum and ilio-cæcal valve occupied the neck of the sac. The incision was extended and the appendix drawn down and excised. It measured six and three-fourths inches in length. The hernia operation was then completed, the neck of the sac being turned upwards and sutured by its ligatures to the anterior abdominal wall, and the rings closed by quilted sutures. Some difficulty was found in isolating the cord from the adherent mass of the sac, and some mechanical obstruction caused considerable swelling of the testicle, but complete recovery ensued without further complication, the patient leaving the hospital on June 1.

CASE XVI.—On April 2?, M., was also operated on for a congenital hernia with an undescended and undeveloped testicle in the sac. The testicle was removed and recovery was rapid and satisfactory.

CASE XVII.—A third radical hernia was performed at St. Luke's Hospital on May 24, upon Miss H. S., aged 20. The rings being closed by a single row of quilted sutures, recovery was rapid and uneventful.

During this period two nephrectomies were performed, for very large, suppurating kidneys.

CASE XVIII.—On January 24, at St. Luke's Hospital, L., aged 35, a patient of Dr. Sewall's, was operated upon. On cutting into the muscle, pus was found before reaching the capsule; the capsule and peri-renal tissues were greatly thickened. After emptying out successive renal abscesses and removing the renal tissue, it was found impossible to apply a ligature, as the tissues broke down with the slightest pressure. The cavity extended from the much-raised diaphragm down to the crest of the ileum. The walls were so rigid that no collapse took place and the cavity closed by slow granulation. When the patient left the hospital on May 6, a small sinus still remained unclosed, leading up toward the diaphragm.

CASE XIX.—On March 30, at the County Hospital, an operation was performed upon G., aged 25, for extensive suppurating kidney accompanying inflammation of the bladder and other mucous membranes. I was assisted by Dr. Boice. The suppurating cavities were easily emptied and the kidney removed. It was then found that the cavity extended from the diaphragm to the ileum, and for two or three inches beyond the spine, the aorta lying posteriorly, exposed in the cavity. The walls were quite flaccid and immediately collapsed; free drainage was made through the wound. Improvement was rapid, but one small sinus still persists.

CASE XX.—Upon December 7, 1894, at St. Luke's Hospital, assisted by Dr. Bagot, I operated upon Mrs. S., for Dr. Bell, for a large rapidly growing tumor in the left renal region. It was found to be a large sarcoma weighing six pounds, and lying anterior to the kidney, extending into the dome of the diaphragm. The patient survived the operation in a very depressed condition for fifteen days. Examination showed that the tissues of the kidney were infiltrated, and also the pancreas, and that the new growth had entirely thrombosed the inferior vena cava.

CASE XXI.—On December 19, at St. Luke's Hospital, for Dr. Coleman of Montrose, assisted by Dr. Craig, I removed from Mrs. K. a large sarcoma which protruded from the vulva as a cauliflower excrescence, about twelve inches in circumference. It was found to come through the left vaginal wall just inside the external opening and to occupy the left pelvic cavity. It enucleated very easily, but about two inches of the rectal wall was so infiltrated that it had to be removed. Hemorrhage was free, but easily controlled. Granulation was rapid and satisfactory and the rectal fistula closed rapidly. The patient went home on January 15, apparently quite recovered, and is still quite well.

CASE XXII.—On April 19, at St. Luke's Hospital, with Dr. McNaught, I operated upon C. P., aged 18; he had a large tumor on the upper thigh, bulging inwards just below Poupart's ligament. The femoral vessels were displaced outwards by it. Two days before the operation a mass in the pelvis was found in the region of the bladder bulging above the

pubes on the same side. He said that on August last he had received a blow in this region from a saddle; that subsequently an incision had been made into the growing tumor, but that hemorrhage had been so free that the wound had been closed at once. The adductor muscles were found flattened and distended over the tumor. On separating their fibres, a soft cystic wall was discovered through which I easily broke with my finger nail, when my fingers entered a cavity filled with fluid, with solid masses floating in it, the muscular fibres completely sealing the opening around my fingers. By manipulation I soon found that the contents were fluid and coagulated blood, and that, in the deeper parts, probably through the obturator foramen, there was a connection between the two masses. The cavity extended over posterior to the femoral vessels, but they were separated from it by some tissue. On allowing the blood to escape, the cavity refilled almost as rapidly as it could be emptied. By careful manipulation I found that pressure towards the vessels controlled all hemorrhage, and that by so arranging the packing as to exercise continual pressure there, the sacs could be emptied and further hemorrhage stopped. The packing was left in for forty-eight hours, when Dr. McNaught removed it and found no further hemorrhage. The cavities slowly closed and recovery was satisfactory. In several operations for hemorrhoids the clamp and cautery were used, as is my rule in ordinary cases.

CASE XXIII.—In one case, however, where a large suppurating pile mass protruded on one side with a complete circle of tumors, I performed the Whitehead operation which I have hitherto found very satisfactory in these cases. The patient at the time of the operation was showing marked symptoms of septic absorption; these seemed rather increased than diminished by the operation and the high temperature continued with much tympanitis and general symptoms of septic absorption. Within forty-eight hours local signs of deeper suppuration were manifest. I am now satisfied that at the time of the operation I did not reach the suppurative focus, and that it would have been wiser to have freely incised the whole ischio-rectal fossa. As it was, I had to make superficial incisions, and later, much deeper open-

ings, before the focus was finally drained. The operation area recovered rapidly and satisfactorily, but the abscesses caused serious symptoms, and resulted in slowly healing sinuses, which took many weeks to close. This result has not discouraged me from the use of the Whitehead operation, as the connection between the operation and the deep abscesses was, I believe, accidental, and not direct; the symptoms before the operation and immediately following it clearly indicated that the deep infection preceded the operation.

CASE XXIV.—One other interesting surgical incident I must also record. In March I was called upon at the County Hospital to open an abscess in the left breast of Mrs. L. T., who had been for some time under treatment for pneumonia. On examination I was struck with the fact that this abscess became tense when coughing, and almost disappeared when air pressure diminished in the chest. I was therefore not surprised to find upon cutting through the breast that the abscess was an empyema with a large opening immediately under the centre of the breast, and that several pints of pus escaped. A second opening lower down, was subsequently made. The empyema was peculiar, being a thin, suppurating area over an adherent lung.

DISCUSSION.

DR. STUVER: I wish to say in connection with the case of patient "L." (Case XVIII) that I saw this man a short time ago and that the wound was healing nicely, and he expected to return to his usual occupation in a few days after I saw him, feeling very well after his return from the hospital.

DR. PACKARD: I would like to make a few remarks on the case of patient "B." (Case IV) of Dr. Rogers, the one referred to in the vicinity of the hip-joint. This case was under my care some time, and it is one of those cases which shows the importance of early operative interference. It was not an ordinary hip case. It began, I think, as a primary periostitis of the trochanter. He fell several months previously, and struck on the trochanter, and as a result of the injury there was pain, localized tenderness and thickening. This periosteal thickening was soon followed by fluctuation; I then opened the

abscess and there was a sinus discharging for some time after. I was satisfied that it was increasing, and I therefore recommended that he go to the hospital, where he came under the care of Dr. Rogers. During the operation he discovered that ostitis had followed this periostitis, and resulted in caries, which extended up the neck, and no doubt would have extended into the joint in a short time. So that the result, I think, proves that the joint was saved by this early operative interference.

DR. LEONARD FREEMAN: Having made the autopsy on the case (IX) which Dr. Rogers has reported, I wish to say a word about the result. In spite of the fact of the abdomen being open several days after the operation, and the intestines out among the dressings, there were no signs of peritonitis, except a few adhesions around the abdominal wound. The adhesion of the intestine to the stomach was perfect in every respect, as can be seen in the specimen being passed around. The opening was somewhat smaller than the size of the Murphy button, but there did not seem to be so large an amount of cicatricial tissue as one would think, merely a fine line, leading to the idea that much subsequent contraction would not take place. The pylorus was contracted, but not permanently so—the contraction being muscular only and easily dilated with the finger. The opening through which the button passed would admit the proximal part of the index finger. The stomach was very much contracted in its diameter, but in length it seemed to be about the same as before the operation, stretching almost entirely across the abdominal cavity. Its circumference was about that of the wrist.

DR. CROUCH: Having some connection with the same case, I may make some reference to it. In the first place, as to the extent of the dilatation, the greater curvature of the stomach reached about half way between the umbilicus and pubis, and the stomach was very much dilated. The examination revealed the characteristic appearance of the contents of the stomach, and the characteristic odor, and an examination revealed a slight excess of hydrochloric acid. The ordinary treatment did not effect the desired result. The patient continued after some time to

emaciate; and it was decided to have this surgical operation, but particularly likewise with reference to the convulsions. As is known in dilatation of the stomach, nervous phenomena occurred, probably due to the toxic materials absorbed, but it seemed doubtful whether that could be possible in this case; nevertheless, as a chance, and in order to relieve stagnation and increase the nutrition, we decided upon the operation; and, as far as the functional result was concerned, it was most satisfactory, and it would have been very successful if the patient had not succumbed to another trouble, as Dr. Freeman has said, the stomach, being relieved of the continued stagnation, had returned to very nearly the normal size.

RESECTION OF THE FEMUR FOR ANGULAR DEFORMITY.

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Angular deformity in the femur following fracture because of poor or insufficient treatment, is at times encountered sufficiently marked to necessitate surgical remedy through resection. Such a patient came to me for operation some nine months ago; a healthy locomotive fireman, of fine physique, but seriously maimed through shortening of the right lower extremity three inches, consequent upon angular deformity in the femur. I resected with satisfactory result, and deformity has been entirely overcome through an original plan of bone-section. According to the angle, so is the shortening; and in the majority of instances site of fracture is about midway between the ends of the bone. The angle of deformity will be outward, or outward and more or less forward; because the femur, though directed slightly inward, to give graceful poise, really bows slightly outward, through which tendency, aided by powerfully contracting mucles, improper or lax provision against such deformity may easily permit it, particularly when the patient gets about. Established and uncorrected, it exaggerates with the use of the limb. Thus, overlapping or riding are not essential to it. In the case I operated—a pure transverse fracture—the ends originally rested against each other, afterward gapping

outward; the vacuity filling with callus; deformity favored and exaggerated through cells yielding internally at the site of bearing, until the limb by reason of this gradual cell compression, and angular deformity, measured (as I have said) three inches shorter than its fellow; actual bone-loss, however, being limited to that part the site of bearing and yielding.

Considerable angularity at this site, aside from co-incident shortening, occasions more or less crippling relaxation of the muscles involved in carrying the leg forward or backward, and gives the incumbent a pitching, peg-leg gait. Extent of deformity, and how far thereby an individual is hampered in attaining livelihood, are chief considerations in calling for or justifying resection.

In surgical remedial consideration of angular deformity it is of course fortunate in establishing a diagnosis to be able to exclude shortening with overlapping or with comminution, as I was enabled to do in the case mentioned; since the results of the operation may reasonably be more satisfactory and accurate.

Before resecting ascertain that the subject is not diabetic. Failure to secure union after resection is far more deplorable than after fracture.

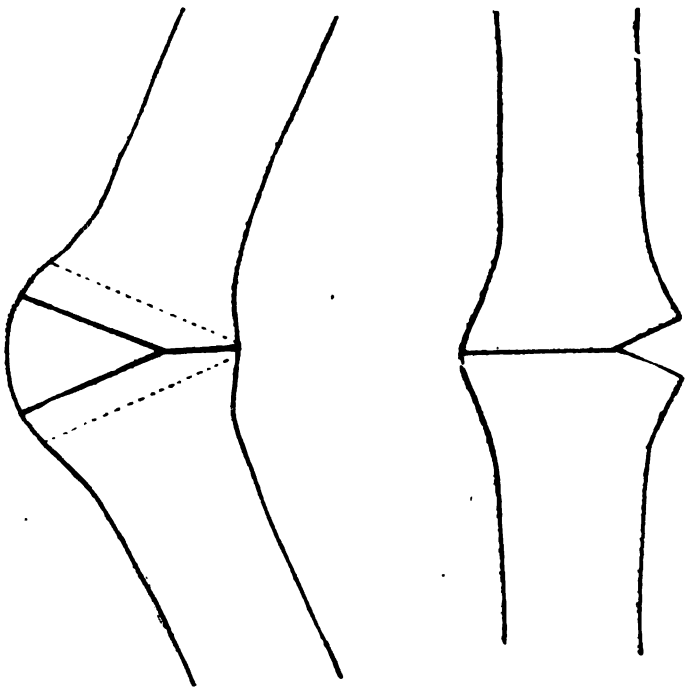
In resecting for correction of such a condition of deformity our best intelligence must be exerted to occasion minimum actual shortening, while adding to the length of the limb by correcting angularity, so bringing it into proper line. Marked angular deformity in the majority of instances is corrected by resecting a wedge from the projecting angle through the entire transverse diameter of the bone, cut from without by a small circular-saw operated by electricity, or by chisel; or cut from within outward by a chain-saw; that end may rest against end after correction is so accomplished, and during repair. If this wedge consists largely of callus which has simply filled a gap at the site of fracture, this plan would be all-sufficient; but as bone-cells are compressed at the site of bearing, at the expense of length, a wedge-shaped incision with straight sides through the bone, that the apex may end here, and then permit the ends to rest squarely in apposition, must be at the expense of actual bone, and must therefore take from the natural length; more so

if the incision be from within outward by chain-saw, which occasions more operative bone loss than other saws because of wide cutting-edge and some side-action. If the saw be utilized, and the angle not correctly estimated to permit end to rest against end in proper line, unless re-incised in the whole transverse extent of one end, the operated bone must be left to repair in improper line, or straightened at expense of incision must occasion interspace, and we have not as sure or good repair. The Y-incision I propose on the contrary permits easy after-correction if necessary, besides possessing other and greater advantages.

The wedge in the Y-incision should in reality take nothing from the length of the bone in overcoming angular deformity of simple fracture without overlapping; for in reality the whole wedge is of new formation, and the saw invades normal bone-cells at its very margin, or at the line of original fracture. When the wedge is removed and the saw cuts through in the stem of the Y to complete section, the previous deformity is overcome by bringing the parts sawn from the sides of the wedge into apposition. This occasions a V-shaped gap in the last third of the transverse diameter invaded; which manouver overcomes the otherwise loss in length through yielding and impacted bone-cells at the place of bearing.

To accomplish this form of bone section—the patient recumbent—the quadriceps extensor should be pressed inward, that no unnecessary structures be involved, and then incised upon and parallel to the bone—natural line—for sufficient extent. The soft parts are to be freed from their intimate attachments to the periosteum to allow retraction sufficient to permit unembarrassed bone-section, by Hey-saw; beginning with one of common depth and finishing with one of greater depth. A sufficient strip from a heavy rubber bandage should be neatly placed and pressed upon them in the grasp of two retractors, that the saw, which must strike against them outwardly, may not wound them. Should a circular-saw operated through electricity be attainable, this rubber guard will be unnecessary.

Correctly situate the Y by fixing an imaginary point two-thirds the distance through the bulging callus from the apex of the projecting angle, to, and in line with the apex of the internal callus in transverse relation, which corresponds with the occluded center of concavity or internal site of fracture. In other words—perhaps better expressive—from the focal point of convexity to the estimated focal point of occluded concavity. Two saw incisions then cut the bone transversely from without, and



Bone saved through this operation is seen between string and dotted lines in illustration.

meet at the apex of a wedge at this estimated point; the base of the wedge having occupied the site of greatest protruberance. The wedge-removed section is completed; the saw cutting the stem of the Y (as in the printed character) in a line exactly midway between and from the projecting arms.

As the femur is cylindrical, this rule applies in correction of simple angular deformity in any direction. However, it should not be forgotten that in certain individuals this bone may have stronger curves, which may call for slight deviation in incision. This may be ascertained in the sound limb. In estimating the two transverse incisions which excise the wedge, and particularly in dealing with outward angularity, it is better to include in the wedge too little rather than too much.

Making satisfactory adjustment, the reflected periosteum is brought together neatly by sufficient interrupted sutures of chromocised catgut; the muscles then grouped and nicely adjusted in the same way by separate suture, and the integument is sutured in the same manner; provision being made for good capillary drainage attained through catgut or black silk strands, or by prepared horse-hair, from the deepest portion of the wound to the surface. Since, from the plan of operation the sutures include minor and minute vessels in their continuity, care should be exercised that only easy tension be employed.

The wound is now dressed antiseptically, and the extremity is placed comfortably at rest between lateral splints; the inner one extending from the groin—where it is well padded—to the foot, and the outer splint reaching from the waist to and below the foot; between these splints and the leg are interposed proper strips of wood-wool tissue or antiseptic wool. The splints are then snugged and secured by wide doubled strips of firm muslin, which include the leg, knee, and thigh separately; fastening with safety-pins. A longer doubled strip should include and fix the head of both splints by a figure-of-eight turn in the groin and waist. This form of bandage is secure, easily applied, and permits readjustment and redressing without harmful disarrangement. Long sand-bags are to be placed laterally for additional support, and these are to be kept continuously in contact with the splints.

At the end of ten days a plaster dressing should be applied, using roller bandages sufficient to encase the entire extremity, and encircling the pelvis, immobilize as well the hip-joint; the extremity extending slightly away, that the dressing may ride higher internally and get good rest for proper counter-extension;

also because the posture is thus made easier and encroachment upon the anus lessened. To give the dressing additional fixity, punctured strips of zinc should be included at the flexure of the groin, and laterally and posteriorly about and parallel with the limb. Provision must be made to trap the wound for the purpose of dressing, and a good strong strip of zinc included to form the upper and lower borders will maintain the splint uninjured and prevent sagging or bulging, which, however, can occur to no great extent if extension from the foot be properly made and sustained during application. It is of the greatest importance for union that this be sufficient, but no more than sufficient. The bone-ends must rest against each other in proper apposition. Drawn apart and left so during application of this fixed dressing, they will be so maintained. This function, therefore, should be entrusted to a co-laborer, thoroughly competent.

The single bed provided for such patient should be firm, the mattress resting on cross-boards and cut transversely in three, that a narrow central portion (twelve inches in width) may slide out entirely with the board on which it is resting at occasion of stool; the patient's limbs meanwhile supported across the chasm on two light padded boards, each placed snugly in contact with and somewhat under each limb from without for security against displacement earlier, and against strain upon the plaster dressing later; the comfort attained encourages the act. A wide tin receiver at a suitable height, beneath, will prove a cleanly measure.

If possible the plaster dressing should be retained for two months, when it may be removed, and the patient allowed gradually the freedom of the bed without further dressing except at night and when first using crutches, when for fear of strain or accident, he should wear light, yet firm, properly padded three-inch lateral splints, the inner extending from the groin to the knee, against which it rests, the outer splint extending from the great trochanter, upon which it rests, to the head of the fibula, against which it rests. The splints maintained by fixing sufficiently long and wide doubled strips of firm muslin with safety-pins. Worn when up and about on crutches, slipping down-

ward may be prevented by attaching the muslin covering of the splints to a firm and nicely adjusted figure-of-eight turn or two of the waist and groin. Freedom from dressings each twenty-four hours favors restoration of circulation, while the daily application for a time of these convenient splints keeps the limb perfectly trained into line. They may be discarded three months after operation, meanwhile patient bears gradually increasing weight upon the limb.

During the bone-forming period of treatment. syrup of the lacto-phosphate of lime given daily, and lime-water each evening, are expedient, while the food also should be selected with the object of facilitating bone formation and organization.

Saw incisions, I think, occasion better reparative inflammation than those made by chisel.

SPONTANEOUS DISLOCATION OF THE HIP-JOINT IN CONNECTION WITH TYPHOID-FEVER.

LEONARD FREEMAN, B. S., M. D., DENVER, COLO.

The hip-joint is one of the best protected of the larger joints. Owing to its construction, to its thorough support by ligaments and muscles, and above all to the pressure of the atmosphere, it is comparatively seldom subject to dislocation. Nevertheless, even spontaneous luxations sometimes occur; and there are certain individuals who possess the power of dislocating their hip-joints at will.

The great majority of spontaneous luxations appear in connection with some pathological lesion, and are generally known as "pathological dislocations." "Spontaneous dislocation" would seem to be a better term, as in some cases disease of the joint is slight or absent; and, in addition, all dislocations are in a sense pathological.

Spontaneous luxation of the hip may arise from: (1) Intra-articular effusion, with stretching of the ligaments and capsule, as may occur in typhoid, typhus, small-pox, scarlet-fever, measles, erysipelas, diphtheria, puerperal-fever, pyæmia, dysentery,

mumps, etc. (2) Destructive processes involving the head of the femur, the acetabulum, the cartilages, or all of these (tuberculosis, osteomyelitis, malignant growths, etc,). (3) Deformitive processes (arthritis deformans, new growths, possibly rachitis). (4) Paralysis. (5) Trophic changes in the structure of the joint (tabes dorsalis, etc.). (6) Long continued mal-position of the lower extremity during some wasting malady, with relaxation of ligaments, etc., and without effusion or other joint-lesion. This has been frequently disputed, but Pitha claims to have personally observed eight cases, in one of which an autopsy was obtained. It is likely, however, that more or less effusion, perhaps temporary, generally exists, as it is otherwise difficult to understand how the atmospheric pressure can be overcome. (7) The deposit of granulation-tissue, etc., in the acetabulum which forces the head of the femur from its position. Konig has observed this in the first stage of coxitis.

Dislocations produced at will scarcely belong to any of these divisions, as they can be regarded neither as "spontaneous" nor "pathological."

In this brief paper I propose to consider spontaneous dislocation of the hip-joint in connection with typhoid, although the accident may take place with other continued and exanthematous fevers. It has been observed in adynamic forms of the disease, generally in male children, is an exceedingly rare occurrence, and attacks the right or left hip with about equal frequency.

In 1877, W. W. Keen, of Philadelphia, collected all the reported cases. Among forty-three instances of arthritis, due to continued fevers, there were twenty-seven spontaneous luxations of the hip-joint, fifteen of which could be definitely traced to typhoid and seven to typhus. The confusion in nomenclature which formerly existed, as regards these diseases, may have led, however, to inaccuracy in these figures. Dr. Keen informs me in a recent letter that he himself has seen but one hip-dislocation following typhoid. Most of our text books do not refer to the subject at all, or but very briefly, although its importance certainly warrants attention.

The phenomenon is clearly related to the arthritis, which, at times, complicates typhoid. This arthritis is generally monarticular, but may be poly-articular, when it closely resembles acute rheumatism, with which it may easily be confused. Suppuration may occur, but often resolution takes place, without the formation of pus. There is usually, however, considerable effusion within the synovial capsule, either serous, sero-fibrinous, or purulent. There may be more or less serious changes in the bones, cartilages, ligaments, etc. The ligaments and capsule are apt to be stretched and weakened, which is an important feature in the affection. Our data, however, lack accuracy, as no autopsies have been made in this connection. In view of the fact that the Koch-Eberth bacillus has repeatedly been found in periosteal affections complicating typhoid, in medullary inflammations of the bones, and in various other lesions, it is not unreasonable to suppose that arthritis may also be due to its presence, especially as arthritis is, at times, secondary to a contiguous ostitis or periostitis (Keen). As has been demonstrated, other micro-organisms may find their way from the intestines into the joints, so that a mixed infection might easily occur. It is claimed by some, however, that the joint-affections of typhoid are always pyæmic in their nature.

In cases which recover without suppuration perhaps the typhoid bacillus alone may be present, as occurs in non-suppurative typhoid periostitis; or it may be that a mild infection with some other germ exists.

As to the way in which the dislocation takes place, most writers agree that the prime factor is over-distention of the capsule with fluid, which weakens and stretches the supports of the joint and forces the bone apart (Bonnet and Parise have demonstrated that by injecting fluids into the semi-flexed hip-joint the bones may be forced apart from one-eighth to one-fourth of an inch). Then some slight wrench, such as turning in bed or lifting the patient with a hand beneath the back and one beneath the thighs, causes the dislocation. Or the trouble may possibly take place gradually by a combination of over-distension and relaxation with mal-position of the limb and reflex muscular tension. The mal-position consists usually in

adduction, flexion and inversion. Stimson adds clearness to the explanation by showing that the fluid which fills the capsule flows into the acetabular cavity as the head of the bone leaves it, thus preventing a vacuum and relieving the pressure of the atmosphere. The ligamentum teres is not necessarily ruptured; Moore has demonstrated that it may be sufficiently elongated by an intra-articular effusion to allow of complete dislocation. Paralysis or degeneration of muscles, as sometimes occurs from typhoid, may play a part in the accident.

As the luxation usually takes place during severe fevers after the third week (Keen), when the patient is delirious or unconscious, it may not be observed at once—perhaps not until convalescence has set in and locomotion is attempted.

Whatever the mechanism of dislocation, it is nearly always onto the ilium near the sciatic notch, and is probably in most cases intra-capsular. Sometimes the head of the bone is found higher up on the ilium, rarely beneath the anterior superior spine and very rarely in the thyroid foramen. Keen cites four cases in which the femoral head was movable in all directions, showing great relaxation of the capsule and ligaments.

In most cases there is little or no pain in the joint at any time, while in some the pain is excruciating, although it may suddenly cease when dislocation occurs. It may be felt elsewhere than in the hip, even in the entire lower extremity, but it is rarely reflected to the knee as in coxitis.

The history of a typical case of typhoid dislocation would be somewhat as follows: A child passes through a severe fever accompanied by swelling of a hip-joint (it must be noted, however, that swelling in this deep-seated part is not always easily detected, even in an emaciated subject). While still in bed, or later on, it is noticed that one of the patient's lower limbs is shorter than the the other, usually one and one-half to two inches, especially when flexed at the hip; and that it is held in a position of partial flexion, adduction and inversion. Keen mentions that owing to the extreme relaxation of the parts about the joint the limb may rarely assume other positions.

Without consideration of the symptoms, and attention to the history, the affection may be mistaken for a late stage of

ordinary tubercular hip disease, especially after a few weeks have elapsed and atrophy of the muscles with flattening of the nates and dropping of the gluteal fold have supervened. Hip-joint disease, however, does not come on suddenly, and its first stages are characterized by abduction and apparent lengthening, although dislocation may very rarely occur (Konig).

In the course of time the femur forms a socket for itself in its new position and considerable mobility may be acquired, especially as regards flexion and extension. This is fortunate, as it is an exceedingly difficult matter in many cases to reduce the dislocation. Even if reduction be accomplished it is likely that it cannot be maintained, owing to the joint lesions and to frequent non-recognition of the trouble until firm fixation on the dorsum of the ilium has occurred.

In the recent "Traite de Chirurgie" by Reclus and Duplay, Lagrange mentions but two cases of reduction of typhoid luxations, one by Lannelongue and one by Capelle. In Lannelongue's case prompt recurrence took place, while in Capelle's the bone remained in place. Keen, however, says that reduction was accomplished in eleven of the twenty-seven cases due to continued fevers in general, but that it is always difficult and often impossible if not attempted at once.

The prognosis as regards restoration of the joint to its normal condition is absolutely bad according to Lagrange, although Keen refers to but two cases in which recurrence took place.

The treatment should consist in a prompt attempt at reduction under anæsthesia. Delay is perhaps more dangerous than with ordinary dislocations, for the pathological lesions may lead to rapid and embarrassing alterations. But notwithstanding how long the trouble may have existed, an attempt should always be made to correct it. Pitha mentions a successful reduction of a spontaneous dislocation of the hip from rheumatism after the lapse of six years. Manipulation should be thoroughly tried, having regard to the fact that the bones of children are more fragile than those of adults, and that an epiphysis may easily be separated. It is advisable to first loosen up adhesions, if any be present, by flexion and extension of the thigh combined with careful rotation. A fracture may

perhaps be avoided as suggested by Pitha, by grasping the thigh close to the joint and not employing the flexed leg as a lever.

In case these efforts fail, it would certainly be justifiable to open the joint, clean out the acetabulum, sever the adhesions and replace the luxated bone, although few attempts have been made in this direction.

If there is a tendency to recurrence after reduction retententive splints may be employed; or, better still, extension by weight and pulley. It is perhaps a wise precaution to apply extension for a time in any case. If these measures fail an arthrodesis would be in place. There is no reason, in these days of aseptic surgery, why a dislocation should remain unreduced without operative interference Lannelongue has obtained the production of new bone about the defective rim of the acetabulum by the deep injection of his 10 per cent. solution of chloride of zinc.

Keen suggests, as a prophylactic precaution in cases of typhoid where there is reason to fear luxation, that the suspected limb should be confined in a position of abduction and eversion.

Considering that we cannot know how extensive the joint lesion may be, or of what character, it is wise to maintain fixation of the limb for several weeks by extension, by splints, or at least by tying the knees together. The patient should not be permitted to walk for six or eight weeks and in some cases longer. It would seem best that the first attempts at locomotion should be made on crutches, with an elevated shoe on the foot of the sound leg, thus avoiding the bearing of weight upon the affected member and giving ample time for the repair of a possibly defective acetabular rim. Cautious passive motion can be instituted in two or three weeks in order to prevent stiffness or anchylosis.

The case I desire to report in this connection was that of a girl of ten years who developed a well-marked typhoid fever about the first of February, 1895. She was placed in the competent care of Dr. Heimberger, of Leadville, Colorado. She was a well-developed and well-nourished child, in excellent

health and with normal lower extremities. Symptoms of meningitis were prominent during the height of the disease, with delirium and at times marked stupor. Near the end of the third week the temperature in the rectum arose rapidly to 110 degrees and as rapidly fell again. Paralysis of both lower limbs, involving sensation and motion, but lasting only two or three days, occurred during the fourth week. Following this there developed tenderness along the femoral veins. During the end of the fourth and beginning of the fifth week slight pain, tenderness and swelling manifested themselves in the right hip, followed shortly by similar symptoms in the left. Most pain was felt in the tendons beneath the knees, especially when attempts were made to straighten the limbs, and seemed to be due to contraction of the posterior muscles of the thighs. Marked emaciation occurred and some small bed-sores appeared on the sacrum.

The child left its bed in between six or seven weeks, and it was not until then that any decided trouble with the hip was noticed, although it had been observed that something was wrong during the latter portion of the illness.

When the child came under my observation, on April 25, nine or ten weeks after the probable date of the accident, she was emaciated and peevishly irritable. The left lower limb was partially flexed, strongly adducted and rotated inwards. There was from one and one-half to two inches actual shortening, when the thighs were flexed at right angles to the pelvis. There was one-half inch difference in the circumference of the thighs, showing atrophy of the muscles to that extent. The gluteal mass was also atrophied and the gluteal fold shallow and depressed. In fact there was a dislocation of the femur onto the ilium near the sciatic notch. The case presented a marked resemblance to the third stage of coxitis, which we at first supposed it to be. There was no tenderness, however, about the hip, either on strong percussion or on decided manipulation. Neither was pain developed by forcibly striking the heel on the affected side. The popliteal tendons, however, were very tender and much pain was aroused by attempts to straighten the knee.

I diagnosticated a "typhoid luxation," and placing the child under an anæsthetic, an attempt at reduction was made with the assistance of Dr. Hawkins and Dr. Heimberger. Flexion and extension of the thigh were possible, but absolutely no abduction. The head of the bone could be felt grating against the ilium while breaking up the adhesions. Considerable force was necessary during manipulation, although reduction was accomplished at the second or third attempt, no sudden "snap" being perceptible. As soon as the bone was replaced, all the motions of the joint returned to normal, including abduction. There remained, however, a slight prominence of the great trochanter and a shortening of the limb amounting to less than half an inch. The latter was afterwards found to be manifest throughout the entire member, including the leg and foot, and was probably the result of a lack of growth during the time the dislocation was present. I have not found this symptom mentioned except in the account of a case of spontaneous luxation of the hip following puerperal fever described by Baker. Keen states, in fact, that the leg after reduction of the dislocation may be longer than its fellow. As a precautionary measure an extension of four or five pounds was kept on the leg for two weeks, after which the knees were simply tied together at night for another fortnight. All pain and irritation rapidly disappeared, and within forty-eight hours the child was perfectly comfortable and devoid of the sharp pains previously caused by sudden contractions of the posterior muscles of the thigh.

Passive motion of the knee and hip were begun about the fourth week. The marked weakness and atrophy of the muscles were slowly overcome by massage and electricity, and by the sixth week the patient was sitting up and moving her limbs about with considerable ease and comfort, the power of flexing the thigh upon the pelvis, however, being but slight. The length of the left limb as compared with that of the right had in the meantime slowly increased until the difference was scarcely appreciable.

In the case which I have detailed the luxation probably took place during the third or fourth week, being due to an arthritis of the left hip-joint, aided by mal-position of the left limb

as the child lay on her right side. Paralysis may have aided in the accident, as did certainly the general weakness and relaxation which were present.

FAVORABLE RESULTS OF KOCH'S TUBERCULIN TREATMENT IN OTHER THAN PULMONARY TUBERCULOSIS.

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The use of tuberculin is either stoutly decried or held in abeyance by the large majority of physicians and surgeons. If the majority were to rule in the determination of such use there could be little advance in this direction. But the mass of physicians have decided this question by hearsay or second-hand, while many others are frank enough to admit the immunity-producing effect of the remedy, but conclude that the liability to error in the diagnosis of concealed *pulmonary* tuberculosis is so great and the knowledge of the limitations of the remedy and the technique of its administration so essential and particular that they hesitate to employ it.

By others it is named a toxine, and that is sufficient argument against its use for them, notwithstanding the strong probability that there is an anti-toxine, an immunity effect, produced by its use in the tubercular individual's system which they have not recognized.

The truth undoubtedly is that the difficulties with regard to its use in pulmonary tuberculosis are increased about five-fold because of the five-times greater activity of the capillary circulation there, greatly augmenting the tendency to over-action to exaggerated necrotic effects in the lung-tissue affected, the exact nature of which an *ordinary* physical diagnosis does not determine. The usual shortcomings of the medical profession in the proper diagnosis and understanding of concealed lung tuberculosis thus become positive hindrances to the extended use of Koch's tuberculin.

The exceptional experience, however, of such men as Treaudeau, Von Ruck and Whittaker, with whom the writer would feel

honored to be classed, tends to give confidence in the cautious use of tuberculin on lines different from those proposed by its inventor, and in selected cases of pulmonary tuberculosis. These lines or indications are such as the rarely-found *uncomplicated* tubercular infection, the chronic state, and the existence already of favorable resistance in the patient's blood to tubercular invasion.

The diagnosis of tuberculosis by tuberculin injections is now a generally admitted fact by a larger number of physicians than those who favor its use in treatment, and the extended use of tuberculin by veterinarians to determine tuberculosis in cattle is confirming the desirability of this procedure. Thus far the writer has made twelve positive diagnoses of human tuberculosis almost solely by this means.

There are, however, some surgeons, like Dr. Senn of Chicago, who do not recognize any value in the remedy. It is for such and other doubting minds that these cases of joint and bladder disease are here submitted. They are such as can not be explained away by the argument of climatic effect, and as for other medical treatment, very little or none was used; and I am firmly convinced that the results obtained should be credited to the new method of cure.

The case of tubercular crystitis first described is unique in the experience of the writer, and as this patient's business, Auditor of the Bell Telephone Company, has called him to every prominent city in the United States, he has consulted and much interested many physicians and surgeons. He has been examined from time to time by Dr. C. A. Powers, who verifies the condition and the improvement.

DENVER, March 8, 1895.

CASE I. H. C. B., age, 54. Dedham, Mass., widower. In 1884, after three years' sickness, his wife died of consumption in the South, where they were living because of Mr. B.'s failing health. There is a possibility of her having been infected with tuberculosis from him, because in 1878 he had throat trouble; was confined in the house a month, was much run down and went south. In 1879, after returning to Massachusetts, he got weak again and his doctor sent him south to reside. Weight

then 112 pounds. Had a cough and yellow expectoration. Resided in Aiken, S. C., from 1879 to 1886. Had been a soldier in the army at the time of the Rebellion, and from then until a year ago had great pain at times in his left kidney, said to be "gravel." Took morphine only from doctors until last August on leaving the hospital, where he had been under treatment some three months, took himself about one-fourth grain a day, and now sometimes reaches three-fourths. He suffered great pain in bladder and did no work from June 6, to November 30, 1894, and came to Colorado January 15, 1895, not appreciating the elevation by any effect upon his lungs. Had had night-sweats before going south, but never any hemorrhages or profuse expectoration; weight at best 160 in 1890; at least, 112 in 1879. Now 140 pounds. In the army had diarrhœa; now bowels inclined to be loose. Has no expectoration nor cough. Sleep is much disturbed and he suffers at times with severe pain in his bladder. While under Dr. Cabot's treatment in Boston a few tubercular bacilli were found in his urine after many trials, in October, 1894. In Denver we have found two, to many fields examined. Pulse 72, respiration 18, temperature 98. (11 A. M.) Spirometrical record 210 cu. in., manometer 80 m. m. Physical examination shows lungs in fair condition, there being only slight dulness at left apex, with some broncho-vesicular respiration there. However, later under the tuberculin treatment from a 10-milligram dose to 70 and above, continued reaction sounds were noticed in the lower half of this left lung, both front and rear. The urine was thick, cloudy, of high specific gravity, and contained pus and sometimes blood. It was voided with great frequency, sometimes as often as every twenty minutes during the night and every five to ten minutes in the daytime, and his attacks of pain were very severe. In washing out the bladder he could hold only two ounces of fluid and always asked to be permitted to relieve himself on arrival at the office.

The diagnosis of tubercular cystitis with probable latent (healed) trouble in the left lung and perhaps in the bowels, was fully confirmed by the reactions to tuberculin treatment, which was urged upon him by the writer. The first dose, 4 mgr., of Koch's tuberculin was given February 14, 1895, and by

various degrees of increase and intervals of administration 80 mgr. was reached, when he went to Salt Lake on business for three weeks. The reactions had been positive, though more general than febrile: a temperature of 99½° Fahr. was reached several times, and twice he felt so badly that he was unable to take the next dose for three days. But good effect always in due time succeeded these reactions.

The diagnosis was positive at the 10-mgr. dose when the lung reaction was marked: *i. e.*, the high-pitched, harsh, broncho-vesicular breathing sound was noted over the left mammary and inferior scapular regions, which the writer has found to be the peculiar effect (in the tubercular lung) of this toxic or anti-toxic influence. Later, the diagnosis was also positive in the back-ache and distress in the neck of the bladder which succeeded the injections of larger doses, 30 to 70 mgr. And later on still, the original diagnosis was still further confirmed by the diarrhœa which was seemingly caused at times by still larger doses, 160 to 180 mgr. The improvement in the bladder was, however, as might be expected, more noticeable after the larger doses: *i. e.*, above 50 mgr. Gradually the urine became clearer, was voided much less often, every two hours, and in larger quantities. By the time the 80-mgr. dose was reached he had reduced the morphine taken three-fourths and later some days left it off entirely. He gained in weight, spirits and looks.

Though half a dozen trials have been made with different specimens of his urine no bacilli have been found since the treatment was well under way.

April 15, 1895, the following note is appended to his record: "Was over in Salt Lake three weeks and since his return has gone on with the tuberculin injections up to 130 mgr. to-day. Urinates only five times during the night. Weight in Boston, 135; now 142 pounds. Looks and feels much better."

May 3, 1895. Took up to 170-mgr. injections every other day to date. Urine contains no bacilli, but strepto-cocci are present. Feels better to-day than any day since last June.

May 21, 1895. Been taking the injections every four days of late. Reactions have been slight. Weight, 140 pounds.

a gain of six pounds since March 8. Looks and feels better. Less frequent micturition and no bacilli found at this time in the lessened sediment. Thinks he must return East on his business. He will continue the tuberculin injections with lengthening intervals and report progress.

In our next case, that of tubercular hip-joint disease, we have the advantage of a longer term of observation.

DENVER, August 13, 1894.

CASE II. Miss M. S., age, 23. Came to Colorado in 1881 and has resided in Fort Collins. Is the youngest of thirteen children, six of whom only are living. The mother at 65 looks sallow and emaciated and appears not to have been well for 30 years. Suspect latent tuberculosis. Said to have "dropsy of the liver," and, what is peculiar, six of her children were jaundiced and died under two weeks of age. This patient, however, takes after her father, though she was never strong as a child. Had typhoid fever six years ago. Seemed to be well four years ago when she fell into a basement and struck on right hip. Hip-joint disease gradually developed so that she could not walk by the next May. In bed six months with a weight on right limb. Wore a brace two years. Walked, if at all, with two crutches for three years and now uses one. Has had sore throat winters for five or six years and this is worse now. Coughed all winter for three winters and raised at times. Coughs less now. No night-sweats or profuse expectoration, but some bloody expectoration from throat last winter.

Weight at most before the accident, 155 pounds, now 112. Expectoration very little. Could get none for examination. Doubtful if any bacilli. Pain in hip, appetite fair, digestion negative for meats and fats, bowels regular and catamenia scanty. Leucocytosis imperfect as shown by paucity of leucocytes in the blood and most of these are granular, swollen or broken. Lips and finger nails blanched and hæmoglobin evidently deficient, though not exactly determined. Pulse 104, respiration 26 and temperature 99 Fahr. (10 A. M.). Spirometrical record 140 cu. in., manometer 45 m. m. Pharynx shows elevations suspicious of tuberculosis. Chest expansion 28–30 1-2 inches, about equal on the two sides. Physical exam-

ination not very positive. Bronchial characteristics slightly extended. "Cog-wheeled" respiration to right of and above the base of heart and prolonged expiration and broncho-vesicular breathing to the left, with slight dulness at apices. The changed voice and breath-sounds, though slight, center around the inner apices front and rear, which, with the suspicious laryngeal and pharyngeal state, are strongly indicative of tuberculosis. Decided on the diagnostic test with tuberculin and the proposition was at once accepted. Two injections of 1 and 1 1-2 mgr. of Koch's lymph left no doubt as to the nature of the case. The constitutional effect was characteristic and remarkable. The prostration at the second treatment was so great that she fainted afterward, and a temperature of 103° Fahr. was reached.

One week later, September 11, 1894, steady treatment with the same remedy was commenced, going back in dose and increasing very cautiously. The following notes are from the record:

October 28. Have worked up to 80 mgr. and reaction breath-sounds were and are considerably diffused. There have been distinct effects in throat and hip in response to the larger doses. Can walk better and hip is better. There have been some cheesy deposits in the elevations on the tonsils, but throat now looks better. Blood condition is decidedly better and no fever reactions exist to the large doses.

November 10. Worked up to 130-mgr. dose to-day. Weight 118 pounds. Is gaining.

December 18. Weight 119½ pounds. Been taking 130-mgr. dose each week for five weeks and goes back to Fort Collins after treatment. Feels better and can walk without a crutch.

January 9, 1895. Been taking 110 to 130-mgr. tuberculin about once a week. Comes to office without her crutch. Has gained to 125 pounds weight.

March 5. Weight 131½, a gain of 21½ pounds since October.

April 23. Comes about every ten days from Fort Collins and takes 120 mgr. No reactions and improvement continues. Has discarded her crutch entirely and limps very little. Last week Dr. C. A. Powers kindly examined the patient and con-

firmed the diagnosis of tubercular hip-joint disease. The prognosis is thought to be excellent, the supposed difference in the measurements on the two sides is found to be due to the tilting of the pelvis. Weight now 133 pounds. Muscular strength comes back slowly, but the general improvement is decided.

CASE III.—L. J. C., male, age, 22, telegrapher, from New York State.

October 7, 1893. Arrived yesterday. A sister died of hip disease and a brother was operated on for abscess of the hip and recovered. Six years previously this patient had strained right hip and had been a cripple for five years. September 28, 1889, Dr. Roswell Parks of Buffalo operated on this hip for an abscess (resection?), and some benefit resulted for eighteen months. Abscess returned in same place and Dr. Parks operated again in October, 1891. January, 1892, a sinus formed opening into right groin, also one in right nates. These are still discharging. Dr. Parks, finding numerous bacilli in sputum, relinquished his intention of again operating and sent the young man to me. I found the right lung in the first stage with bronchiectasis, and the left in the second stage of tubercular disease, the whole left upper lobe being involved. With his hip discharging a drachm or more a day and exercise impossible, I could not see how the climate here could meet the conditions. The case was to me hopeless, unless some immunity could be produced. He had night-sweats and profuse expectoration now two ounces thick and yellow, containing many bacilli "to the field." Pulse 96, respiration 24, temperature 102° Fahr. (3 P. M.), spirometrical record 135 cu. in., manometer 40 m. m. Weight in health 142, now 112 pounds.

October 10, 1893, tuberculin injections were commenced, very gradually at first because of the double infection and extreme susceptibility.

April 10, 1894. The record shows that a dose of 65 mgr. tuberculin has been gradually reached and that some reactionary sound is still appreciable at base of right lung, rear and apex of left front, where, over the left bronchus, there is yet almost "cracked metal" on stethescopic percussion and mucous rales on coughing. But the bacilli have evidently been driven from the

sputum, which is one-half reduced in quantity. The discharge from the hip is very little indeed; strength much increased; color better, and weight 117¾; in fact, general improvement. His temperature has gradually decreased under treatment.

September 4, 1894. Has been out on a ranch near Morrison, and taken no medicine during summer. About August 1, caught cold and had high fever. Some fever yet, 101° Fahr. Weight 118, looks better, bowels regular and appetite good; expectoration lessened three-fourths, manometer and spirometer records increased. Expansion of chest increased from 29–32 on arrival to 30–33½ inches. Slight dulness and some mucous rales on coughing still remain at apices in front, especially left.

January 19, 1895. Have increased the dose of tuberculin, giving every four to six days up to 130 mgr. at highest, and the control of the temperature rise which was to 102° Fahr. has been beautifully illustrated by his progress since the commencement of the second series of injections. The general improvement has been decided. His chest sounds are much drier, spirometer record 150 cu, in. and manometer 90 m. m., a decided gain. Weight 119. Improvement continued after this, and what was remarkable, his temperature remained nearly normal for months, His low financial state and inability to get suitable work have been discouraging. Contrary to my advice he went back east in May. His condition, however, was favorable—more than simple arrest. He has a certain degree of immunity to rely on.

In the face of such evidence as this* (and with proper discrimination the use of tuberculin in *pulmonary* tuberculosis has as good a defence), and in the presence of a patient who declares that the authorities of a certain place where he has been, urged by certain local physicians, have sought to interdict the use of tuberculin at all, the writer must express his chagrin for the unreasonable fear and prejudice of some of his profession. He feels justified in claiming that one such case as

*For description of other interesting cases, including one of chronic tubercular meningitis, and another of tubercular knee-joint disease of long standing, see "Diagnosis of Tuberculosis by Tuberculin Injections," in *New York Medical Journal* of February 3, 1894.

the second here given is worthy of more credence than a hundred failures by others who, as likely as not, have not duly appreciated the remedy or the conditions under which it should be given.

The writer trusts his own course has been consistent since four years ago in the Denver Medical Association he demonstrated an immunity or healing principle contained in tuberculin, announced the discovery of the peculiar reactionary breath-sound due to the healing process in tubercular-affected lung-tissue, and declared that even should the medical fraternity decide against the the use of tuberculin he would continue himself to use it, or some of the to-be-discovered derivatives of it, in his practice. Ever since that time, when the writer has been at home in Denver, he has used the drug and found ample justification in this postive, though sometimes necessarily more or less transitory immunizing influence.

Of 130 or more cases treated, all but one of thirty-three cases *without softening* are known to be living, and forty-five out of ninety-seven cases which had reached or passed the stage of softening in lung tissue are also known to be living, of whom twenty-seven are favorable results in single or double-cavity cases.

It should be understood as quite possible that unjust and unwarrantable explanations of assumed unfavorable results in certain cases may be made. Perhaps that cannot be wholly avoided under existing conditions, but if a reference to patients here were the desirable procedure, the writer could name quite a number who now, even after several years, enjoy something of the immunizing influence conferred upon them by tuberculin. But how would you judge and what would you do with the voluminous records of their examination and lives? You are already tired out, no doubt, with this presentation, which is respectfully submitted with the regret that so large a subject should be limited to so small a time for its consideration.

APPENDICITIS: REPORT OF SIX CASES.

W. W. GRANT, M. D., DENVER, COLO.

Better and more accurate methods of diagnosis will not alone explain the frequency of appendicitis. It bears a close relation to the dietetic habits of the people. It will continue a common disease so long as people depart widely and habitually from a wholesome regimen and the plain demands of hygiene in habits of living. I do not overlook constitutional vices and tendencies in certain cases. It is my opinion that, in most cases, the individuals have been much troubled with indigestion for some time previous to the acute attack, a catarrhal condition of the cæcum preceding and accompanying the disease.

The theory of Talamon and Rochaz, that the disease is generally due to a concretion or calculus, is not sustained. Ekehorn believes that the bacillus *coli communis* is a common ætiological factor, and this is more generally accepted; still, it is *sub judice*. It is the belief of many surgeons that this bacterium is the cause of the extreme fatality in general septic peritonitis, being always found in these cases and absent in those that recover.

Dr. Maurice Richardson, of Boston, a surgeon of wide experience, writes me that he has never known of a recovery under these circumstances. Whatever theories may obtain as to its cause, pathology and symptoms, it is evident that the disease is not infrequently overlooked, and even with a correct diagnosis, the mortality is yet large.

With the view of presenting certain features and forms of the disease, I give the brief history of a few cases:

CASE I.—Mrs. C., aged 28, married. I saw this patient in consultation on March 20, 1893, the tenth day of sickness.

Had much pain in right hypogastrium, fever from the beginning and chills for the last few days. Temperature now 104½. The swelling or tumor extended from the anterior spinous process of the ilium to the border of the right rectus muscle.

The attending physician had been in some doubt as to the nature of the trouble, thinking it might be abscess of the broad ligament. There was no longer any doubt that it was an appendical abscess and I was requested to operate. I made a free incision and evacuated a large quantity of pus and fæcal matter. Irrigated with salt solution and drained with iodoform gauze.

Recovery uninterrupted and patient sitting up in two weeks and wound closed in six weeks. Recovery perfect and permanent, with greatly improved digestion.

CASE II.—Louis McCormack, aged 24. This patient was brought to me from Goodland, Kansas, by Dr. Worrell, with diagnosis of appendicitis on June 25, 1894, the seventh day of sickness. Tumor and history similar to former—undoubted abscess, though much smaller.

I operated immediately on arrival at St. Joseph's Hospital. Incision external and parallel to the cæcum. A pint of pus and scybalum evacuated. Irrigated with sublimate lotion, 1 to 4000, and drained with iodoform gauze. On seventh day after operation fæces washed from wound, but none after this date. Patient discharged well on fourteenth day after operation. He is perfectly well to date. These two cases well illustrate the common form of circumscribed abscess from perforation of appendix. The latter is excluded by adhesions from the peritoneal cavity. The abscess is extra-peritoneal, and the operation should be. With this object in view, the incision here made is preferable to the Willard Parker incision, parallel to Poupart's ligament. Besides, the danger of ventral hernia is less. The danger of rupture into the peritoneal cavity and death from septic peritonitis is too great to admit of one hour's unnecessary delay when it is known that pus exists,—chills followed by increased temperature and pulse specially indicating it. No special effort should be made to find the appendix in these cases. It would be bad surgery to break

up adhesions for this purpose. There is no compensation for the increased risk and, if a rent is made into the peritoneal cavity, the patient will probably die in consequence.

The treatment by free incision and drainage is entirely successful. The patients do not suffer from subsequent attacks; and even if one should occasionally occur, a subsequent date is infinitely preferable for further operative interference. The suppurative process doubtless destroys the appendix and it is as incapable of further harm as if cut off by the knife.

CASE III.—Dr R. W. Corwin of Pueblo, was taken sick on March 7, 1894, with great pain over appendix and abdomen, with vomiting and purging, latter lasting four days; vomiting ceased in twenty-four hours. Temperature 102, pulse 116. Both reduced and patient better after twenty-four hours. Continued to improve in every way until the 14th, when he got up and visited a patient, temperature being about normal. He was immediately worse and retired to bed again but did not keep it faithfully.

I saw him on the evening of March 17. Temperature 100½, pulse 96. A small but well-defined appendical tumor. Was satisfied that neither pus nor perforation existed. The question of operation was immediately presented and had to be determined at once. His history and local and general condition indicated that, with absolute quiet, proper diet and good care, he would get over this attack without operation.

This case was a forcible illustration (tenth day of sickness) of the lesson that it is sometimes too late for an early operation and too early for a late one, so I advised delay and the removal of the appendix when over the acute attack. During convalescence he visited his home in New York City, and on April 20 the appendix was removed by Dr. McBurney. He was in hospital four weeks. The organ was sacculated; the lumen obliterated not far from cæcum and at the distal extremity a small cavity with no pus or concretion, surrounded by thickened, hardened walls of the appendix. An operation in the first few days of sickness in this case might have been indicated. But inflammation, breaking adhesions and traumatism at a later date would have rendered the result more doubtful.

CASE IV.—On April 14, 1895, was called to see Dr. W., at his residence in this city. Had a short attack a year ago of supposed appendicitis. Sick now several days. Temperature 101 evenings and 99 mornings, pulse 84 to 96. Had much digestive trouble for a long time. Considerable bloating of abdomen and some pain. No well-defined tumor, but steady, deep pressure revealed a hard swelling beneath the cæcum. My expressed opinion was that he had appedicitis; that its situation was the ileocæcal fossa; that if pus formed, it would be in the most favorable situation,—retro-peritoneal—and suggested that an operation might be necessary soon. To this he did not take kindly. I saw him two or three days and he improved so much that my visits ceased.

On the 21st he walked into my office looking pale and bad, with a temperature of 100½. He believed that he was suffering from a mild typhoid fever. On the 23d he sent for me. Temperature 101; tympanitis more extensive. I reiterated former opinion and the next day he was convinced by rupture of the abscess, fortunately into the bowel. He passed during the day a large quantity of most offensive pus.

His complete recovery was now uninterrupted. Had he died, he would have believed it due to perforation of the ileum from ulceration of Peyer's glands. There are excellent reasons for the opinion that many patients die, though fewer than formerly, from perforative appendicitis, when it is called perforation from typhoid ulceration or perforation from inflammatory pelvic diseases.

CASE V.—Mrs. F. L. W., aged 22, married; Denver.

I was called on the evening of January 23, 1894. Pain sharp and acute all over abdomen. Now pain and tenderness greater over appendix. Had taken a dose of Hunyadi water and had purged freely, attended with some nausea; pulse 120 and weak; temperature 100.

Gave hypodermic injections of morphia and atropia, which induced a fairly quiet and good night. Morning of the 24th patient felt much better; pulse 108, temperature 100½; tumor small and circumscribed, tympanitis moderate. Condition remained about the same until morning visit January 25, when

temperature was 103, and I advised immediate operation, and, at the same time, requested consultation. With several conferences the operation was delayed until noon, January 28. The temperature was now 104½, and patient very weak. Dr. J. W. O'Connor was called in counsel and I proceeded to operate, making a straight incision over cæcum. On opening the peritoneal cavity gas, with marked fæcal odor was at once manifest. Introducing the fingers the appendix, containing a concretion, could readily be felt and was drawn into the wound and ligated. It was soft and thoroughly gangrenous and the distal end contained a large fæcal concretion, which I now exhibit. It was surrounded by small abscesses which had ruptured, and by means of which gas and a small quantity of fæcal matter had escaped into the peritoneal cavity. The walls of the cæcum were so thick and hard from inflammation that the opposing surfaces could not be approximated; and the entire peritoneal surface was covered with a gray and greenish lymph.

The general infection and the bad local condition rendered pouching of the stump impossible and a fæcal fistula probable. A piece of omentum as large as the hand was removed because gangrenous. The intestinal and abdominal peritoneum was much infected and there was incipient general peritonitis. Irrigation was not employed for fear of spreading the infection, but the cavity was cleansed with sponges. The caput coli was enveloped in iodoform gauze and the ends brought out of the wound. The coils of the ileum were isolated from the diseased tissues as much as possible with the same material and brought to the surface in the same manner; antiseptic dressings and bandages were applied to abdomen. I regard no drainage material as equal to gauze for infected localities. Digitaline and strychnine injections were given hypodermically before the operation (a good rule to observe in all severe operations), and during this operation repeated injections of nitro-glycerine and additional strychnine, the patient not requiring much æther.

She reacted very well, and with reasonable promptness. After the operation much difficulty was experienced in moving the bowels. Enemata were given with no success, and, on the

third day, a dose of Hunyadi, as distention was becoming troublesome.

January 31, fourth day after operation, intestinal paralysis was evident and distention increasing, causing much distress.

February 1, condition of patient very bad; was vomiting, without nausea, and with, practically, little effort, large quantities of dark, liquid matter of strong fæcal odor. I determined in this emergency to aspirate the colon. No anæsthetic was given and with Dr. O'Connor's assistance I introduced No. 2 needle (Codman & Shurtleff) into the middle of the transverse colon and evacuated two quarts of dark, offensive liquid and a large quantity of gas. With assistants pressing the abdominal walls, the contents were all forced in the direction of the needle, so the evacuation was quite complete. Patient expressed immediate relief; vomiting ceased at once and in twelve hours the bowels commenced to act without artificial means.

Improvement continued from this time on. A fæcal fistula resulted but closed without operation in two months, a tortuous fistula, not fæcal, remaining two months longer.

Following severe operations on abdominal viscera, and especially the bowels, intestinal paralysis occurs with sufficient frequency to merit our profound interest, because always dangerous and difficult to manage. I am not aware that aspiration for both gas and liquid has been previously done for this condition. Palpation and percussion showed that both existed in this case before the application of the remedy.

Dr. Richardson, who reports over 200 cases of appendicitis, in a letter to me states two objections to the needle in this condition (though he has not used it for this purpose) has known the knife to be by Dr. Warren in one case, with good results: First—"If needle is small, will become obstructed; and if large, lead to extravasation." We can not entirely escape danger. I believe neither objection well taken; for the distention being always due largely to gas, is relieved before the needle is withdrawn (and in the act, suction should be maintained).

The collapse and elasticity of the muscular fibres close the opening the moment of its withdrawal. Besides, no needle smaller than No. 2 should be used, and No. 3 may be, with

safety. This method is safer and better than the additional shock of æther and a second cutting operation. In the knowledge and experience of Dr. Richardson, fæcal fistulæ are not uncommon and unually heal without operation. In such a history as this,—sudden attack, sharp, intense pain radiating from the appendix and extending over the abdomen with nausea, diarrhœa and fast, small, weak pulse, with evident shock, indicating, as I believe, perforation, partial or complete, of appendix—I believe it would be best to operate as soon as reaction is established, if the temperature is 100 and a tumor can be felt.

CASE VI.—E. A. Watrous, New York City, aged 30. Taken sick in Leadville Friday evening, May 10, 1895. Came to Denver accompanied by his physician, Dr. B. S. Galloway, Monday evening, May 13, and placed in my charge. Was taken to St. Joseph's Hospital. I saw him at midnight with well-defined tumor over appendix; temperature 101, pulse 80. Had a chill en route to Denver. No diarrhœa or vomiting; tympanites moderate. When I returned in the morning to operate, his temperature was 104, pulse 96. I was satisfied the latter was naturally slow, and this was confirmed by convalescence, pulse being 60. I made a longitudinal incision a little external to cæcum and entered at once the peritoneal cavity. Appendix readily found. It contained pus throughout its entire length; had no concretion. On lifting into the field of vision for ligation, a little pus escaped through a pin-hole perforation. It was tied near the cæcum and cut off. A part of the adjoining mesentery, much inflamed and covered with grayish lymph, was also ligated and cut off. A piece of omentum half as large as the hand, badly inflamed, was treated in the same manner. I present the appendix as an excellent specimen of the gangrenous form— similar to former case, though not in such a bad state of decay and disintegration.

This form of the disease, with the appendix hanging in the pelvic cavity is the most dangerous of all, and gives little time for deliberation,—perforation, as a rule, inducing a rapidly fatal general peritonitis, the colon bacterium of Escherisch giving it its intensely unfavorable character.

The patient is walking about and will leave for his home perfectly well.

With a certain diagnosis, when to operate, if at all, is a most interesting problem. I believe the teaching of Reclus,—that the operation should be performed in every case as soon as the diagnosis is established, has more advocates in this country than in any other.

On a former occasion before this Society, in reporting an operative case, I presented the statistics of Bigelow against this practice, as well as the opinions of others in its favor. Am frank to say that I have little confidence in the teaching of such figures. For obvious reasons they are misleading.

I am more than ever convinced that every case of decided severity should be operated on, not necessarily immediately, but it will be required sooner or later; in most of these cases, though, within a few days. No iron-clad rule can be laid down as applicable to all cases. I reiterate my formerly expressed opinion that each case should be judged on its merits as to operation and time operation. Some will die if operated on at an unfavorable time, that might have recovered without; but more will die if not operated on at all. All recurring cases should be operated on, preferably, in the interval, because the most favorable time.

In the four cases of this report operated on by me it would have been better and safer if the operation had been done sooner in each case. Cases V and VI, both intra-peritoneal, bad and unpromising, would have died in a short time but for the open method of treatment by gauze. No form of tube and no other form of drainage material answers the purpose so well. In Case IV the operation was not clearly indicated in the very early stage, but it was before the abscess ruptured.

DISCUSSION.

DR. POWERS: However much may have been written during the last few years on the subject of appendicitis, its very great importance renders it always welcome in a general society of this nature. So far as concerns the indications for operations and the conclusions, the reasoning of which leads Dr. Grant to agree with Reclus and the men in this country who

follow him, notably Dr. Murphy of Chicago, Dr. Deaver of Philadelphia, and one or two other men of prominence—I think that it will be very generally acknowledged that the profession at large, especially the surgeons of the country, are not as yet in accord with that view. Certainly I know that in the large eastern cities in which this question has been very much debated, the general concensus of opinion is to the effect that no iron-clad rule can be laid down. If we are to follow the hard and fast rule that every case of appedicitis is to be subjected to operation as soon as the diagnosis is made, we are relieved of all responsibility. I think that we should all welcome such a conclusion if we could feel that it were founded on the best of reasoning. It would relieve us, both physicians and surgeons, of responsibility, if we could say to the patient or to his friends that the diagnosis of appendicitis was exceedingly probable, and that we had no recourse to delay. I do not think, sir, that this rule can be accepted, and, as I say, it certainly is not as yet accepted by such surgeons as Richardson, whom Dr. Grant has cited, by Bull, McBurney and Abbe, of New York, as well as Keen and others, men of very wide experience in these cases. Every case, I think, must be judged upon its individual merits. Each case must be judged according to the conditions which it alone presents. In a given case of appendicitis, if the symptoms do not tend to improve at the end of twenty-four or thirty hours, I think that we may very safely say that operation will prove to be less hazardous than delay. Certainly there are a very considerable number of cases in which the diagnosis is plain—in which the diagnosis of appendicitis can be accepted without question, which go on and recover. Perhaps I misunderstood Dr. Grant in saying that he would operate on every case.

DR. GRANT: Dr. Powers did not understand me. I do not operate on all cases.

DR. POWERS: Then we are in accord. I do not believe that the extremists are right in this matter. One should not delay unduly, but many cases go on to recovery without operation. It has been my fortune during the last few weeks to have operated three times for appendicitis, and to have seen as many

more cases in which I have advised against operation. If the patient has had two or three attacks of moderate severity of appendicitis, I think that operation in the interval will prove safe. The mortality in this has been thus far about 2 per cent. In these cases it will be safer to operate between attacks than to wait for an acute attack; for any acute attack may prove speedily fatal.

DR. ANDERSON: I wish to make a few remarks on appendicitis, as it happens to be a question that twenty years ago, when I was in practice, we did not know anything about. I operated on a case and cured the man. I could bring him here to-day, living and well. I thought at first he had a little "belly-ache;" but now I know that he had an inflammation of the vermiform appendix. I want to say that I think in appendicitis it is a very uncertain thing to know how to operate and when to operate.

DR. GRANT: I don't say that every case requires operation or even that every case required it at once. I say they do not, but the great majority of the severe cases will require it within a few days of the attack. The views of Dr. Richardson, I think, are that most cases, whether done instantly or not, will require operation sooner or later. Of course, if these milder cases get well, if the patient is pretty nearly well, it is a safe operation. It should be done after the second attack without any question whatever. I think that one who has had these attacks, and who has not concluded to have the operation, will have to have it, perhaps, when his chances of recovery are not so good.

TREATMENT OF COMPOUND FRACTURES.

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In the consideration of the proper methods of treatment of compound fractures it is essential that we make a classification of the cases, for the term "compound fracture" is a very broad and comprehensive one, including, as it does, any fracture where

there is a channel of communication from the seat of fracture to the surface of the body, or to any of the cavities which are in communication with the external atmosphere. We encounter them where the fracture is the important thing to be considered and the wound is of secondary importance; on the other hand, we find them where the wounding of the soft tissues, and not the bone, is the most important feature.

By classification of the subject we will be better able to consider the proper methods of treatment. I have therefore made the following divisions:

I. Cases of recent origin, seen before infection has taken place, where there is a wound resulting from a sharp edge of bone penetrating the skin and underlying tissue.

II. Cases seen before infection has taken place, where there are extensive wounds of the soft tissues, allowing free communication to the seat of fracture, which may be single or double.

III. Cases where the injury to the soft tissues is either mild or severe, and where the case is not seen by the surgeon until infection has already been established.

IV. Cases involving joint cavities.

V. Gun-shot fractures.

I. Cases of recent origin, seen before infection has taken place, where there is a wound resulting from a sharp edge of bone penetrating the skin and the underlying tissue:

This class of cases is less frequent than the second variety; the lower leg is its most common seat. It occurs where the line of fracture in the tibia is quite oblique, the upper end of the lower fragment usually lying anterior to the lower end of the upper fragment. These cases are many times the result of indirect violence, being produced by falls, the bone snapping, as it were, and the sharp end of the lower fragment being driven through the skin and underlying tissue, producing a wound of variable size. The sharp angle of bone may be immediately returned to a relatively normal condition, or may remain projecting from the wound, and many times also from the clothing, when the patient is first seen. These cases are also produced

by direct violence, the wound in the soft tissues being due either to penetration of a foreign substance, or the external pressure causes a wound of the soft tissues directly over the sharp end of one of the fragments.

These cases are the simplest of all to handle, provided the case is seen early and the surgeon's methods are faultless as to aseptic technique. If the sharp angle of bone has simply punctured the skin, the hemorrhage will have been, in all probability, moderately severe from the wound and into the surrounding tissues. The channel of communication from the seat of fracture to the surface is presumably in an aseptic condition. It is the surgeon's duty, then, to render the surroundings aseptic, and to preserve them in such a condition. If he shall have succeeded in doing this, he will then have practically a simple, uncomplicated fracture to deal with. If the wound is small and the hemorrhage moderate in amount, it will not be necessary to irrigate the wound at all. The parts are to be shaved, then scrubbed thoroughly with a nail-brush and soft soap, alcohol and æther; finally, with a strong solution of mercuric bi-chloride. The tissues having thus been brought into an aseptic condition, an aseptic dressing should be applied. If the wound be only a small punctured one, it can be sealed over with iodoform or sennine powder and collodion. If the wound be somewhat larger, say from one-half to one and one-half inches in length, the edges should be approximated by sutures, and then an iodoform or sennine dressing applied in the usual manner. The fragments are then to be brought into proper approximation, and the parts put up in whatever variety of permanent dressing it may be the surgeon's pleasure to employ. My usual method is to apply a plaster-of-Paris splint, made of bleached butter-cloth folded into six or eight thicknesses, and about four or five inches wide, according to the size of the limb, and long enough (in case of the lower leg) to reach from the knee down one side of the leg, underneath the foot, and up on the other side of the leg to the knee. This is to be applied directly over the dressings and the uncovered portion of the leg without any padding, aud is to be held in place by an ordinary roller bandage. When the plaster of Paris becomes set it forms an admirable support to the frac-

tured bones fits every irregularity of surface; the seat of fracture can always be inspected with the greatest of ease by simply slitting a few turns of the roller bandage over the line of fracture. At the end of six or eight days the splint can be opened by cutting the roller bandage in front and behind, and by turning one or both sides down, the dressings can be removed or changed and the splint reapplied, and another roller bandage put on. This dressing is the most convenient and serviceable one for these cases that it has ever been my pleasure to employ. The soft tissues in these mild cases unite in a few days under aseptic methods; the compound fracture is converted into a simple one. From the time of complete union of the wound the progress should be as in the case of a simple fracture, union should take place in about the same length of time and cause the surgeon no more worry than a case of simple fracture.

II. Cases seen before infection has taken place, where there are extensive wounds of the soft tissues, allowing free communication with the seat of fracture, which may be single or double:

Under this head come the majority of compound fractures as ordinarily understood. This class could be extensively subdivided, the sub-division being based upon the degree of destruction of the bone or other tissue. Thus, we may have a single line of fracture with a moderate amount of laceration of the soft tissues. The laceration of the soft tissues may be limited to the skin and sub-cutaneous tissue, or it may involve the muscles in the immediate neighborhood. The nerves, arteries or veins may be torn; the skin may be extensively separated from the underlying tissues. Again, we may have the bone extensively comminuted; fragments may be loose and denuded of periosteum or displaced to a very great degree. On the other hand, we might divide these cases, and endeavor to classify them on a prognosis basis, for this class will include cases of such a mild character that the prognosis is absolutely good; and also those where it requires but a moment's inspection by an experienced surgeon to say that the part has been so badly damaged that all hope of rescue is gone. In such cases the question of treatment involves the consideration of the point as to when

and where the limb shall be removed. The day was when the term compound fracture was invariably coupled with that of amputation. Before the days of aseptic and antiseptic methods of treatment, septicæmia and pyæmia were the usual results to be expected after a compound fracture, and amputation was resorted to in the hope of preventing the development of those dread diseases, and thereby saving the patient's life. Within the memory of many of the youngest of us, the death-rate in compound fractures from septic affections alone was from 40 to 50 per cent., whereas, at the present time, the death-rate from such causes should be *nil*—provided, of course, the patient is seen by the surgeon within a reasonable time after the injury was received. To-day a limb is saved which a few years ago would have been sacrificed. It is not uncommon even now to find surgeons recommend amputation in cases where, to one familiar with aseptic methods, the thought of amputation would not occur. It is a comparatively uncommon thing to-day to witness an amputation for a compound fracture, our modern methods having restricted this method of treatment to exceedingly narrow limits. Formerly, comminution of bones, loss of a few inches of bone and extensive laceration of soft tissues called for an immediate amputation; profuse suppuration and beginning symptoms of septicæmia and pyæmia also indicated the same line of treatment. Many patients died also from the fact that a primary amputation was done while the patient was in a condition of profound shock. To-day, by rendering the parts aseptic and by the use of aseptic dressings, we may defer amputation a number of days, if need be, until all symptoms of shock have passed, without the least fear of septic manifestations. There is a class of cases, severe ones always, where the surgeon may be in doubt as to the exact extent of damage; it may not be possible to say just how much tissue has had its vitality crushed out. In these cases we can lose nothing if we allow the parts to remain as they are, under aseptic dressings for a few days, until we can see exactly how much sound tissue remains. This is a method I have adopted in a number of cases, and have been rewarded by finding enough sound tissue left to enable me to save the part. Experience has shown me that we may have a large amount of soft

tissue torn away, and still be able to cover in the defect by plastic operations. Thiersch's method of skin-grafting enables one to cover in large denuded areas without subsequent scar contraction. Large amounts of muscular tissue may be torn away and still the parts preserve their usefulness.

J. H. had his left leg caught under the car-wheels, thereby sustaining a compound fracture of both bones of the lower leg, fully one-half of the muscular tissue of the calf of the leg was torn away, with the overlying tissues. Under aseptic dressings the fracture united, the extensive wound of the soft tissues granulated and was then covered in by skin-grafting. He recovered with almost perfect use of the leg.

A. P, sustained a compound fracture of the lower leg in very much the same manner. The tibia was so badly comminuted that it was necessary to remove entirely three inches of both bones; the soft tissues were extensively lacerated. Some who saw the leg advised immediate amputation. The bones were, however, resected, and the ends wired together with silver wire. Under aseptic dressings he recovered with a useful leg, three inches shorter than the other.

There are, however, unfortunate cases which are beyond the surgeon's saving skill. A few years' service in the medical department of a large railway at one of its terminal points will bring to the surgeon cases so badly mangled by the car-wheels that nothing but amputation is to be thought of; such cases are those brought in with bones badly comminuted, soft tissues badly torn, arteries and nerves severed. With these cases the prime object of all treatment is to arrest hemorrhage, overcome the profound shock and put the parts in an aseptic condition. It is still a disputed question as to whether amputation should be done at once (even if the patient be in a condition of shock) or whether we shall wait and devote our energies to restoring the nervous system to its normal condition. After nine years experience in this class of work, I am of the opinion that it is not an evidence of sound judgment to undertake an operation of such magnitude during a condition of shock, and to-day it is not necessary. All bleeding points can be ligated, the wound and surrounding parts can be made thoroughly aseptic, aseptic

dressings can be applied with sufficient pressure to control possible hemorrhage, and retentive apparatus applied with a positive knowledge that our patient is not running any risk of sepsis by the delay; and at a subsequent time the amputation may be done with a better hope of success. It may have fallen to the lot of some of you, as it has to me, to see a class of cases where amputation is demanded immediately; not on account of the severity of the original injury, but as a result of gross carelessness or negligence on the part of the surgeon first called to treat the case. A tourniquet left on too long, or a splint applied too tightly, may be the cause of gangrene, and immediate amputation is demanded. It has been my experience to see a case of this kind from both of the above mentioned causes—the first due to a tourniquet placed around the thigh tightly to prevent possibility of hemorrhage on the way to the hospital, which consumed a number of hours; it effectually prevented hemorrhage, but made necessary a leg amputation. The second was a compound fracture of mild degree; it was dressed by the surgeon in attendance, and a plaster-of-Paris roller bandage applied; twenty-four hours afterwards I saw the case, removed the dressing and amputated a gangrenous leg. The other class is that where the first dressing was not properly done, and the case so badly septic when first seen by the surgeon that it is deemed advisable to remove the source of infection, that the patient may have a better chance for life. Fortunately these cases are very few to-day, for most men have some idea of what is meant by asepticism, and although they may not be perfect in their methods, they do better than they would were they entirely ignorant. The consideration of the methods of performing amputations does not come within the province of this paper.

The consideration of the treatment of compound fractures not necessitating amputation, in the first place concerns the method of dealing with the wounds of the bone; secondly, methods of dealing with wounds of other tissues; and, lastly, methods of securing rest for the fragments.

If the line of fracture be a single one and of moderate obliquity, and the two surfaces can be easily brought to their

normal relations, the wound of the bone requires no other attention than to be sure that none of the soft tissues are caught between the two surfaces. If the fracture be very oblique, or if it is with difficulty that the opposing surfaces can be brought together, and there is great disposition to a return of the deformity, it may be necessary to use some means for holding the fragments together other than the retention splints. The methods in vogue to accomplish this are numerous. Wiring the fragments together with silver wire is one of the simplest and most frequently used. Holes are first drilled through the two ends, begining about half an inch from the fractured surface, either straight through the diameter of the bone, or in a slanting direction, to emerge on the fractured surface at a point half through the diameter of the bone. Silver wire of moderate size is then passed through the holes, and the ends firmly

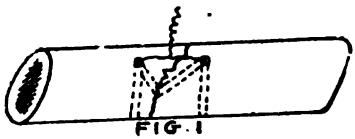
FIG. 1

twisted together as shown in Figure No. 1. Holes may be drilled through the fragments in such a manner that they cross each other at the line of fracture, midway between the two surfaces of the bone, and ivory or steel nails driven through. My own experience leads me to prefer the steel nails, as the ivory ones are very frail and quite liable to be broken in the subsequent manipulations. The nails should be square and highly polished, and can be easily sterilized by heating to a red heat.

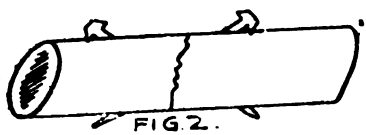
FIG. 2.

They are to be introduced as shown in Figure No. 2. These, as well as the silver wire, are to be left in place until union of the fragments has been established. Silkworm-gut may be

used in the case of an oblique fracture by passing it around the fragments several times and tying it tightly, as shown in Figure

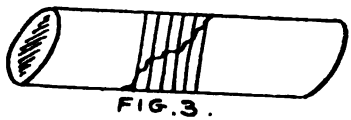
FIG. 3.

No. 3. This method I have used several times, and in certain cases I find it very satisfactory. As suggested by Senn, bone ferrules can be made by taking fresh bones of animals, and cutting them out until they have the diameter of the bone upon which they are to be used. These are then decalcified and sterilized, and are to be slipped over the ends of the fragments. forming a joint like that in a fishing-rod. These plates are

FIG. 4.

very soon absorbed, which is the main objection to them. The manner of applying them is shown in Figure No. 4.

If the fracture be very oblique a very neat way of holding the fragments in line is to drill one or two holes straight through

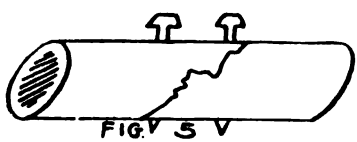
FIG. 5.

the bone, including both fragments, and then drive either ivory or steel nails through, as shown in Figure No. 5.

A method which has occurred to me as being of possible service in some cases is to take a small steel plate one-fourth inch wide, one-sixteenth thick, and from three-fourths to one and one-half inches long, with the ends bent at a right-angle and sharpened. Holes are to be drilled in both fragments to receive

the sharp bent ends of the steel plates; the surface of these plates to have grooves near the ends to receive a medium-sized silver wire, which is to pass completely around the bone and

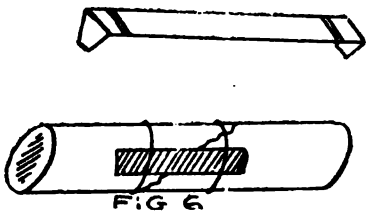

FIG 6

plate, as shown in Figure No. 6. This method will hold the fragments absolutely secure, and when union is complete they may be removed, or may be buried and allowed to remain.

If the bone or bones are extensively comminuted, and the fragments are detached from the periosteum and surrounding tissues, it may be necessary to remove them entirely. Many times, by proper methods, the fragments may be brought into apposition with the rest of the bone by means of small-sized silver wire or silkworm-gut passed completely around the fragments and twisted or tied. This measure I have adopted when fragments have been widely separated. In those cases where there is loss of bone-tissue, the ends of the fragments should be squared off, and if in a locality where there are two parallel bones, the other one must be resected to the same extent. The fragments may then be held in position by one of the methods already mentioned. All periosteum should be preserved and carefully replaced. The torn edges may be united with catgut.

Something has been done in the way of bone-transplantation, where, owing to extensive comminution of the bone, a section has of necessity been removed, but the results have not been entirely satisfactory. The section implanted must be freshly removed from a young, growing animal, and must have the periosteum and medullary canal intact. An absolutely aseptic condition must be maintained; the least amount of suppuration will defeat the whole scheme. Decalcified bone-chips have been used with the idea of their acting as a stimulation to the bone-

forming cells. I have used them in that way a number of times, and feel that they have served the purpose well.

As to the wounds of the soft tissues, enough can not be said as to the necessity of obtaining and maintaining an absolutely aseptic condition of them; this can be done, no matter how extensive the wounds. In severe compound fractures there is usually a large amount of bruising and laceration of the soft tissues. There may be separation of the skin from the underlying tissues over an extensive area; nerves, arteries, veins and tendons may be torn: the injury to the soft tissues may be so great that, although the injury to the bone is slight, the part may have to be sacrified entirely. Much can be done even in the very severe cases. All shreds of muscular and fibrous tissue should be snipped off, and the wound made as regular as possible, for every particle of necrosing tissue forms a nidus for infection and an obstacle to rapid union. All periosteal tissue is to be preserved and carefully replaced. Torn muscular tissue is to be brought together and secured by catgut sutures; fasciæ are also to be brought together in the same way. Tendons which have been severed should always be united; nerves which have been torn should be carefully brought together and secured by catgut sutures; if the proximal end can not be found the distal end can be spliced into the trunk of some other nerve, which has not been divided. It is very important that divided nerves and tendons should be properly looked after if we would obtain the best results for our patients.

The soft tissues can be brought together layer by layer with buried sutures, and finally the skin can be brought together with silkworm-gut sutures; but in these cases we must always allow for drainage, and strips of gauze form the best possible method of drainage, as they drain by capillarity and keep the wound-surfaces dry. There are many cases where there has been such extensive destruction of the soft tissues that the wound can not be treated in the manner outlined. In these cases we must treat the wound as an open one; tissues that can be, should be approximated, and then the wound packed with gauze. When the wound-surface has become thoroughly cov-

ered with granulated tissue, Thiersch's method of skin-grafting may be employed to cover in existing defects.

As to retention methods in these cases, I believe that plaster of Paris forms the best dressing we have. A dressing of this kind can be so applied that only a portion of it will have to be disturbed when the dressings are changed. Steel bands may be incorporated in the plaster of Paris to give additional security. Suspension apparatus for compound fractures of the lower extremity is often of value, as it allows changing of dressings and freedom of motion on the part of the patient, and at the same time insures quiet to the fragments. At times it will be found a valuable and necessary assistance to maintenance of accurate apposition of the fragments, to sever tendons of certain muscles which by their action tend to increase the deformity, as for instance the tend-Achillis, the ham-strings, biceps, triceps, etc.

3. Cases where the injury to the soft tissues is either mild or severe, but where the case is not seen by the surgeon until after the infection has already been established.

This class of cases should be less frequent even than they are; but in a part of the country where cases must be transported long distances for the purpose of obtaining efficient care and proper hospital accommodations, the first dressing of these cases often falls into the hands of a layman who applies one of the various popular dressings, or a surgeon who has an idea that if he will only put on a piece of iodoform gauze, all will be well. Unfortunately, some of these cases come to us in all stages of septic infection, from the mildest to the most severe. What shall be our treatment in these unfortunate cases? It should be to restore, if possible, and as early as possible - the parts to an an aseptic condition; subdue the inflammatory processes already established; prevent the after-development of septic germs and their ptomaines and eliminate from the wound and surrounding tissues those already formed. This we are to accomplish by placing the patient under an anæsthetic, opening up freely the wounds. Where the skin is separated from the underlying tissues it should be slit up; every pocket should be opened up; counter-openings should be made to allow of free drainage; all shreds of sloughing tissue should be cut away.

The wounds are to be thoroughly irrigated with solutions of mercuric bi-chloride and the wounds packed and drained with iodoform gauze. Irrigations should be made at frequent intervals and many times it is advisable to have the part suspended and the wounds kept under constant irrigation with antiseptic solutions, or the part may be kept submerged in an antiseptic solution for several hours at a time. By such methods of treatment we can usually subdue the septic processes and convert the wounds into aseptic ones again, when they can be treated as we have already outlined, treating them as open wounds and covering in the defect afterwards by skin grafting. Local treatment is of course to be supplemented by proper constitutional treatment. The treatment of these septic cases demands much patience, care and experience. The free use of the knife is demanded where there is pus; its collection in pockets should be quickly noted by carefully following the temperature-chart, and as quickly evacuated.

4. Cases involving joint-cavities.

Before the days of asepticism these were certainly cases to cause the surgeon great anxiety and the patient great risk to life. Suppuration, septicæmia, pyæmia and tetanus were the great stumbling-blocks. To-day cases of compound fractures into joint-cavities do not come to the operating table with the frequency of former years, Operation is reserved for those cases where there is great comminution of the bones going to make up the joint-surfaces, coupled with extensive lacerations of the soft tissues, and also to those cases coming to the surgeon already in a state of septic infection.

The simplest cases should be properly disinfected, rendered aseptic and aseptic dressings applied with the fragments in apposition and the joint in the most comfortable position in a state of fixation with plaster-of-Paris dressings. Cases a little more severe should be provided freely with drainage before the dressings are applied. Those severe cases where there is great comminution of the bones, and laceration of the soft parts, demand operative measures; resection of the joint in whole or in part is called for. Conservatism should guide us in all of these cases. Remove as little as possible, a partial resec-

tion giving many times a more satisfactory result than a total one. Preserve periosteum wherever possible; the character of the resection and the after-treatment will depend somewhat upon which joint is involved and the kind of a joint it is desired to obtain afterwards.

5. Gun-shot fractures.

This division of our subject opens up a question capable of extended discussion. It is not my purpose to deal with it in its entirety. Gun-shot fractures in civil life are not very frequent and are usually produced by weapons at short range either those carrying shot or lead bullets. In a general way we can say that all of these cases are comminuted fractures; that in most cases there are splinters of bone, shreds of cloth and, possibly, the bullet in the part affected. The principles of treatment do not differ from those involved in the treatment of other compound fractures. Thorough cleansing of the tract of the bullet, removal of detached fragments of bone, preservation of the fragments which are not wholly detached, removal of the bullet if it can be readily located, antiseptic cleansing, aseptic dressings and thorough immobilization of the parts form the proper line of treatment. Union takes place as readily as in other compound fractures. Fragments may become necrosed, in which case they can be removed later on. If the injury involve a joint, resection is demanded at once. It should be done promptly and thoroughly.

ENLARGED PROSTATE AND ITS OPERATIVE TREATMENT.

WILLIAM P. MUNN, M. D., DENVER, COLO.

Enlarged or hypertrophic prostate is said to be a common condition in the latter half of life. The majority of writers upon the subject estimate that about one-third of all men over 50 years of age have prostates that are enlarged. The gland probably remains normal in about 50 per cent. of men who reach that age, while in the remainder, say one-sixth, the gland atrophies.

It must not be supposed that an enlarged prostate necessarily causes symptoms of importance in every case. In at least two-thirds of the patients who have enlargement there are no symptoms whatever, and the subject is unaware of any abnormality. In the remaining cases symptoms occur which may vary in intensity from the mildest intimation of an irritable bladder to the most severe and painful conditions that can be imagined by the mind of man.

The prostate is the homologue of the uterus. Its so-called enlargement or hypertrophy is not a true hypertrophy, but, rather, a pathologic process, that can best be compared to the development of fibroids or of fibro-myomata in the uterus, only that in the male these growths occur more frequently after the age of 45 years, while in the female their occurrence ante-dates that age. We are accustomed to thinking and speaking of the lateral lobes of the prostate, and of its adventitious middle lobe. In reality the gland, normally, is not well lobulated. Its apparrent lobular character is due to its tendency to develop fibroids or myoma or fibro-myomata of a globular shape, and these, being frequently developed bi-laterally, give the enlarged gland the appearance of bi-lateral lobulation. When an additional node develops centrally we have what has until recently been designated as "the middle lobe of the prostate." These are the more common locations of the fibroid new formations. It is not unusual, however, for the fibroid nodes to be irregularly developed; in which case one side of the gland may be quite free from enlarged nodules, while the other is swollen irregularly with globular nodules super-imposed upon each other, and readily separated from each other, so that the individual nodes may be hulled out like nuts from a shell. Upon section, these nodes are almost wholly made up of white fibrous connective tissue, and are surrounded by irregularly meshed involuntary muscular fibres. With these facts in mind, we at once see how inaccurate is the term, "hypertrophied prostate," for the glandular structure is not in the least increased. The gland has been enlarged *en masse* by the development within it of fibroids, but it has not hypertrophied.

An enlarged prostate assumes importance clinically in pro-

portion to the extent to which it interferes with the act of urination. Its anatomic relations with the bladder and urethra are so intimate that it seems strange at first thought that two-thirds of the cases in which it occurs do not complain of such interference. But in these cases the enlargement is slight and probably somewhat uniform.

The prostate may enlarge uniformly or irregularly, bi-laterally or uni-laterally, posteriorly or anteriorly; and upon the limitations and the direction of its enlargement will depend to a great extent the array of symptoms making up the clinical picture in the individual case.

Four principal symptomatic manifestations are dependent with more or less exactness upon four different effects of the enlargement. 1.—Frequent and urgent micturition is first dependent upon the fibrous infiltration of the tissues of the internal sphincter vesica, thus causing a more or less permanent patency of the vesico-urethral orifice, and permitting urine to enter the prostatic urethra before the bladder has had time to become completely filled, and thus commanding at once the reflex impulses controlling micturition.

2.—Painful or burning micturition is dependent largely upon acrid ammoniacal urine and a degree of cystitis dependent upon its presence. The essential cause of ammoniacal urine is decomposition dependent upon retention of a small amount in the basal cul-de-sac formed by the projection of the enlarged prostate into the cavity of the bladder.

3.—Obstructed or difficult urination is due to encroachment upon the urethral canal by the enlargement.

4.—Uncertainty in identifying the calls to urination and to defecation, due to posterior enlargement of the gland and its projection into the rectum.

Enlargement is more likely to occur toward the cavity of the bladder and of the urethral channel than in any other direction, because, posteriorly and inferiorly, fascia of considerable resisting power enclose the gland, while anteriorly and superiorly there is no obstacle to the enlargement. The result of upward and forward growth is to elongate and render tortuous the prostatic portion of the urethra, while at the same time

the vesico-urethral orifice is elevated to a higher level and made more permanently patent from the cystic side. Thus the cystic orifice is more patent from within, while the adjoining prostatic urethra is less patent both from within and without, on account of its tortuosity. The lengthening of the prostatic urethra is well appreciated when, during an operation by the perineal route, the operator's finger is introduced through the wound in attempting to explore the bladder. In an ordinarily thin subject with a healthy prostate the terminal phalanx of the index finger will project into the bladder beyond the internal sphincter vesica; in a subject whose prostate is much enlarged the whole length of the finger is grasped in the prostatic urethra and not even its tip passes into the bladder. In the three cases operated upon in February last I found this great depth of the prostate.

The curve and direction of the prostatic urethra is a matter of some importance. We are accustomed to regard it as simply representing a larger arc of a circle of somewhat greater diameter than the normal urethral curve. To a limited extent this is correct, but as a rule the prostatic urethra is little, if at all, curved. When curved it is of a form very different from the arc of a circle.

The encroachment upon the caliber of the urethra by fibroid new growths is most irregular and differs in almost every case. It is sometimes a lateral encroachment, sometimes an encroachment from the floor, sometimes from the roof and as a rule never from any one direction alone but from several directions at the same time. The result is that the modification of the urethral channel is most irregular in shape, with but one tolerably constant condition,—viz, an elevation of the internal orifice. In some cases the urethra is almost straight, in others, an oblique angle is present; very often a right angle is present upon the floor and a more obtuse angle upon the roof; lateral encroachments contribute to the formation of an irregular corkscrew channel.

This acquired irregularity of the urethra has led to the adoption of a metallic catheter for prostatic cases which has a greater curve than the ordinary catheter. That this instrument

may sometimes be introduced when those having the ordinary curve fail, is true. But still the curve which is usually given them does not conform to the modified prostatic urethra. I have devised an instrument which seems to me to have a form more nearly correct than those ordinarily used. The curve is long and represents a section of an ellipse to which a coudee tip is added. The coudee tip is of great assistance in passing over obstructions of the urethral floor. Indeed, the turned-up point is the feature of the ordinary prostatic catheter which, to my mind, explains the success that so often attends the use of that instrument,—the point, not the curve, is the element of success.

Enlargement toward the rectum may often be extreme, and may exist for many years without the occurrence of any urgent symptoms directing attention to the urinary tract; on the other hand, enlargement projecting forward or upward may occasion severe symptoms when rectal examination discloses little or no enlargement upon the posterior and inferior aspect of the gland. Hence the importance of a careful and painstaking examination of the prostate in all suspicious cases, both by rectal digital exploration and by instrumental exploration of the bladder and urethra, and by both measures simultaneously employed. In addition, it is perfectly justifiable in cases where the symptoms are obscure to make a median perineal urethrotomy as an exploratory measure. The temporary rest which this last measure affords the bladder during the period of complete drainage will more than compensate for the slight element of danger which it may occasion. At times this operation in itself is more or less permanently curative of urgent symptoms, while it affords a comparatively safe method of

exploring the prostatic urethra, sometimes the bladder as well, and of determining the feasibility of more extensive operative procedures for the radical extirpation of the new growth.

TREATMENT. – Probably two-thirds of all cases coming under observation may be satisfactorily treated by the occasional use of the catheter to relieve an attack of acute retention, and by the routine use of mild antiseptic bladder-washes at intervals varying from once a day to once a month. This palliative treatment by catheterism must be carefully conducted and cleanly, in order to attain complete success. It demands either a reasonably constant supervision by the surgeon, or an unusually intelligent co-operation by the patient. I had one patient who had used the catheter habitually during a period of over fifteen years; another used it at intervals of several weeks during a period of ten years, and many others who have gotten along with comparative comfort by its occasional use during shorter periods of time.

While it is possible for urination to be accomplished without severe pain and at intervals not shorter than three or four hours, and while the urine remains acid or clear—either naturally or by means of antiseptic medication or irrigation—this palliative treatment will be all that the case demands.

But when, in spite of all precautions, the urine becomes and remains ammoniacal or full of pus, when urination occurs as often as every hour, and is accompanied by severe pain and accomplished only after much effort, when the use of the catheter is no longer easy, but is obstructed, painful, perhaps bloody, the danger-line has been reached.

Without operative intervention the further progress of such a case is almost invariably toward a painful, miserable, fatal termination. Sleep is interrupted at first, and soon absolutely prohibited. The call for urination becomes yet more and more frequent, until, without the use of morphia or opium, there is not a moment's rest for the inflamed bladder or the overwrought nervous system. Not infrequently the mind gives way under the awful strain, and the last few weeks or months witness a lapse into utter imbecility or acute mania. The picture is as awful, as painful and as certainly hopeless as it well can be. It

justifies the surgeon in recommending, and the patient or his friends in accepting any proposition for operative relief, no matter how great the risk or how repellant the operation from an ethical standpoint.

From this brief review of the clinical picture, it is evident that operative interference is indicated, (a) when catheterism becomes difficult, painful or necessarily more frequent than every three hours; (b) when, in spite of aseptic catheterism and antiseptic irrigation, decomposition of residual urine occurs and persists; (c) when, with or without catheterism, the interruptions of sleep are so frequent as to injure the general health; (d) when persistently recurring spasm of the bladder is not relieved by catheterism or by medication.

It is evident that in any case operative procedure, in order to be successful, must be carried out before the vital forces are so lowered by pain, loss of sleep, anxiety and perhaps septic infection, that they can not stand the shock or carry the organism through several weeks or months of confinement in bed. And in this connection it is necessary to seriously consider the general condition of the patient in selecting the operative route or method. The patient whose arteries are markedly sclerotic, whose limbs are wasted, whose nutrition is far below par, must be recommended to have that operation which can be most quickly performed, which will be followed by the least shock and the shortest convalescence. The younger and more robust our subject, the more likely will he be to survive the more severe operative procedure. The general condition then, as well as the local condition, must determine our recommendation and choice of method. The procedures are:

1.—Those which aim at the relief of the bladder by simply providing drainage. There are three: (a) Perineal drainage by trocar and canula, followed by a catheter inserted through the perineal fistula (temporary). (b) Drainage by means of perineal urethrotomy, permanent or temporary. (c) Supra-pubic drainage by supra-pubic cystotomy and establishment of a permanent fistula.

2.—Operations aiming at permanent relief by incision or excision of a part or the whole of the obstructing growth.

There are three: (a) Perineal prostatotomy and prostatectomy. (b) Supra-pubic prostatectomy. (c) Combined perineal and supra-pubic prostatectomy.

3.--Operations aiming at permanent relief by inducing atrophy of the prostate gland. There are three; (a) Interstitial injections of ergot or ergotin. (b) Castration. (c) Ligation of the spermatic arteries.

Patients whose physical condition is such that extensive operative measures are contra-indicated should only be subjected to operations of the first or of the last class. No patient should be allowed to suffer the long-drawn-out agonies of a living death from prostatic obstruction without having some one of these operations offered to him. Humanity demands it, surgical science sanctions it,—even in cases apparently most desperate.

Drainage by trocar and canula is applicable to patients suffering from acute retention and so reduced as to contra-indicate any extensive operation. Or it may be resorted to for men who urgently demand relief and who will not consent to be cut. It may, if necessary, be performed without an anæsthetic.

Drainage by perineal incision may be quickly accomplished, the complete anæsthesia lasting not necessarily longer than ten minutes. The urethra being opened, its prostatic portion should be well dilated, either with the finger, if the prostate be not too deep, or, otherwise, by the use of a strong dilator, such as Goodell's uterine dilator. A self-retaining catheter of silver or of hard rubber may be inserted, and the urine drained off through an attached soft rubber tube, which passes down under the bed. In many cases it seems better to use a soft rubber catheter in the wound, especially if the deepness of the prostatic urethra will not permit the ordinary-sized hard catheter to be retained. The soft instrument in such a case is fastened in place by means of a safety-pin passed through both lips of the perineal wound; the external end of the catheter is attached to a piece of tubing passing under the bed. It is a good plan to couple the catheter and the tubing by means of a piece of glass tube, so that the color of the flow can be observed. Free incision of the prostate itself in connection with the perineal incision constitutes the

operation of perineal prostatotomy, and is sometimes efficient in re-establishing a permanent low level urethral orifice.

Supra-pubic drainage is adapted to spare men not yet far advanced in life, and not much exhausted by pain and loss of sleep. Unless resisting power is good the supra-pubic incision is an operation involving considerable shock, and therefore not to be lightly undertaken. It is the operation of choice in men still active, who are seen early in the disease, and who wish to still take part in the activities of life. In performing this operation I discard the rectal bag, preferring to rely upon the Trendelenburg posture and dilatation of the bladder with water to insure an open extra-peritoneal, supra-pubic avenue of entrance to the pre-vesical space. In spite of all precautions it is, however, possible to accidentally open the peritoneum, especially in patients whose bladder-walls are hypertrophied and the bladder-cavity contracted.

I have examined post mortem at least two bodies in which it was impossible during life to dilate the bladder sufficiently to raise it above the pubic bone, and in each case found the bladder so closely contracted and hidden behind the pubes that it would have been impossible to open it extra-peritoneal by the supra-pubic incision. In operating by this method I have once been so unfortunate as to open the peritoneum, but no peritonitis resulted, and apparently no ill results accrued to the patient, who eventually died from other causes.

Personally, I prefer when operating by this method to make the transverse incision, snipping as a rule one-half or two-thirds of the pubic attachment of the pyramidalis or the rectus, as the case may be, and thus securing a more open field of operation.

To maintain the supra-pubic opening as a permanent avenue for urination, Senn has lately devised a new tube, shaped somewhat like an ordinary self-retaining catheter, which can be worn for an indifinite time with comparative comfort. Comfort is, however, only a relative term when used in this connection. No super-pubic fistula can be so well taken care of that it will not leak, and thus keep the surrounding skin in a more or less constant state of irritation.

Senn has advocated, and many other surgeons have adopted

a method of performing the supra-pubic operation in two steps. The first step consists of a simple incision through the skin and connective tissue, and suturing the anterior bladder-wall to the skin at both ends of the incision. The wound is left open and lightly packed with gauze for about three days, at the end of which time adhesions have formed and the bladder is opened—sometimes without an anæsthetic—and the drainage-tube introduced. This procedure has much to commend it, and is especially adapted to cases in which nothing more than drainage is proposed.

PROSTATECTOMY.—The removal of the whole or a part of the prostate is one of the most difficult and dangerous operations known to surgical science. By the perineal route alone it is exceptionally difficult, and as a rule very bloody. A few surgeons, however, have almost unparalleled success in the employment of this method. An unusually long, strong and dextrous right index finger is the element of such success, the average index finger being too short to permit of free use of the terminal phalanx through the deep and narrow perineal wound. Hence the supra-pubic route offers increased facilities in enabling the operator to excise with fingers, scissors, curette or biting-forceps the whole or a part of the obstructing gland. As a rule the protruding enlargement is removed from within the bladder as a "collar" from the urethral orifice. Whether the supra-pubic incision be made alone or utilized in conjunction with the perineal incision, prostatectomy remains as an operation to be completed largely, if not wholly, by touch. Hemorrhage is more readily controlled by packing when the incision is supra-pubic.

Interstitial injections of ergot I have never had any experience with, as I have never had a patient who was willing to assent to such a method.

Castration as suggested by J. William White, as a result of experiments on animals, has been eagerly accepted by many surgeons and patients as offering a safe and frequently certain method of relief. The statistics now accumulated show, as a result of more than 120 operations, that within a few weeks after complete castration the symptoms of urg

frequent urination are much diminished in severity and are sometimes completely abated. After several months the diminution in size of the prostate is very marked and may be readily observed by rectal examination. This operation seems to offer the safest and most certain assurance of relief to sufferers from prostatic hypertrophy. Its use must be in properly selected cases, preferably those whom other operations have failed to relieve; those who are devoid of sexual desires, and in those in which the inflammatory element is a marked cause of clinical symptoms.

These remarks on operative treatment are based upon ten operations for relief of enlarged prostate in eight patients.

Six were perineal prostatotomies; two were supra-pubic drainage operations; one was supra-pubic prostatectomy; one was double castration.

The results were as follows: Of the perineal prostatotomies one complete recovery, with absolute relief; two recoveries in whom second operations afterward became necessary; one partial recovery, death after three weeks from coincident cancer of liver; one partial recovery, death after four weeks from cardiac rupture; one death from shock. Of the supra-pubic cases, two deaths from shock; one partial recovery, death after four weeks from mal-nutrition. In the case of castration, which was secondary to a prior perineal prostatotomy, there was complete and rapid recovery, with disappearance of almost all symptoms, and two-third reduction in size of prostate.

We have then seven recoveries from operation, three of which died a month later from other causes, and two of the others eventually became the subjects of future operation. The net result of ten operations being two complete recoveries, five partial recoveries and three deaths.

Three of the patients operated upon were 80 years and over, one was 77, two were between 60 and 70, one was 50 and one 49 years old.

DISCUSSION.

Dr. Leonard Freeman: I have listened with great interest to Dr. Munn's paper. I wish to say a word or two about

the operation of castration. Undoubtedly it offers greater prospects of relief to the patient than any other operation. At the same time it is liable to be employed too indiscriminately. There are many cases of cystitis from prostatic enlargement which can be cured by care and patience; the inflammation can be reduced and the patient relieved from most of his annoying symptoms. Of course he must put up with the use of a catheter two or three times in the twenty-four hours. Two or three cases have applied to me here in Denver, in which castration had been advised. They were old men; they were feeble; they had considerable cystitis; they had sclerotic arteries and beginning surgical kidneys; and if they had been operated on the result might have been fatal. But by washing out the bladder once or twice a day, as the case demanded, with solution of permanganate of potash, gradually increasing in strength, the cystitis was cured in three or four weeks. The patients are now suffering no inconvenience from their bladders at all, except the inconvenience of catheterizing themselves regularly. One is a man in whom the sexual appetite has long disappeared. The other still possesses sexual desire to a considerable degree. To the latter it is a source of constant satisfaction that he did not have his testicles removed. I do not wish to say that the operation should not be used; it is a useful operation; but it should be used with great care. As Dr. Munn stated in his paper, these old men have cystitis, dilated bladders and surgical kidneys, besides being weak and debilitated, and any, even a slight operation, such as the removal of a finger, might result in death. This is to be carefully considered in weighing the chances of such an operation as castration.

DR. STODDARD: I would like to ask if there is any truth in the statement made by certain medical writers, that men who have gonorrhœa never have hypertrophy of prostate. I have seen that stated.

DR. MUNN: I will say in reply to Dr. Stoddard that one of these cases operated on had, in addition to enlarged prostate, an extensive perineal stricture, the result of repeated attacks of gonorrhœa, and had just recovered from an acute attack of that disease. In reference to Dr. Freeman's remarks, I would

say that in the paper I agreed with him entirely in taking that stand. I think that castration should as a rule be reserved for patients who have been already the subject of other operative measures for relief. In one case in which I used it the patient had been under observation for four months, and subjected to medical treatment and bladder-washing; later on, to incision of the perineum and prostatotomy, and was not relieved; as he was anxious to have castration, it was done. The beneficial effects were marked and satisfactory. The man regained control of the bladder, and had increased thirty pounds in weight three months after the operation.

IS BICYCLE RIDING CONDUCIVE TO IMPOTENCY?

JOHN T. DAVISON, M. D., DENVER, COLO.

The difficulty of answering this question literally will be apparent when it is considered that sufficient data are not at hand to enable one to say with positiveness whether or not impotency is caused by bicycle riding, especially when such riding partakes of the nature of an excess.

The writer is prepared to maintain that by indirection at least we may expect to hear of an increasing number of cases of impotency which, when traced to their origin, will be found to be due to conditions provoked or aggravated by devotion to the wheel. So far as the writer knows to the contrary, there is not a single article upon this subject—the relation of bicycling to impotency. Therefore, much of the answer to the question remains for the future to elaborate. It was for the purpose of inducing discussion of this subject that the article was written, in the hope that some of the members present may have met with an authentic case or cases in which the impotency, not previously existing, could be fairly traced to bicycle riding. A few considerations as to the essential nature of impotency may not be out of place as serving as a guide to that class under which this form would fall. False impotency in its various phases may be dismissed, as it is not a question at present, as to the proper co-ordination of mind and matter, of desire

and its accomplishment. Any case of impotence traceable *to* bicycle riding would come under the head of true impotence because due to a manifest lesion of some organ or part. Bearing in mind the definition of Keyes* we should expect to find in a case coming under this head inability to erect the organ. or the non-ejaculation from the body of a mucous fluid in a man otherwise potent, or the influx to the bladder of the seminal fluid due to alteration or injury to the veru montanum

The direct answer to this question is hard because the time since bicycling has become a craze is short and we are not apt to meet with many cases among the younger generation. There is every reason to believe that excessive riding will produce in time a general indifference of the perineal and adjoining regions to external stimuli. It certainly causes increased prostatic action, for bicycle riders admit increased discharge of mucous from the urethra. Instances of prostatitis, more or less acute, set up and maintained by long-continued, excessive riding upon improperly-shaped saddles, have occurred. The fires of old gonorrhœas have been relit. Hemorrhoids are rendered more active. Pain and irritation about the anus is fairly common. These and other affections of the regions of the perineum and adjoining structures are evidences of congestion and inflammation, which conditions being constant or often-induced will result in more or less extinction of sensibility of the parts affected. As to the truth of the foregoing, we have abundant evidence in medical literature and our own common experience. Not only is lack of response to stimuli induced, but we may look for and do find structural alteration in parts to which there is an abnormal determination of blood; in this case, most commonly manifested in enlarged prostate. The relation of enlarged prostate will soon be apparent.

Now, as it is well known that certain debased individuals resort to the stimulation of any of the parts mentioned to provoke and maintain the venereal cycle, resulting in due time to complete lack of response to any stimulus however intense, analogy of reasoning prompts us to believe that the bicycle

*Keyes' Genito-Urinary Diseases and Syphilis, p. 428, ed. 1888

stimuli produce in time an exactly similar condition of affairs. Let it be understood that no well-balanced man is assumed for an instant to be directly influenced toward the venereal excitement by bicycle riding; but, if through any excess in riding, resulting in nervous inaction or incapacity of the region implicated, we may expect to find, with one link of the chain of interdependence broken, that there will be a manifestation elsewhere of the break, and why not as often expressing itself as impotency as any other condition? Gross† mentions among a number of the causes of impotency, disease of the prostate and bladder. Disease of the prostate particularly, we know, may be caused by excessive bicycle riding, especially upon an improperly-shaped saddle; therefore, coupled with diseased nervous susceptibility, we have two prominent factors in the causation of impotency. A goodly number of intelligent bicycle riders have been consulted as to the effects of excessive riding in regard to potency, but thus far all replies have been such as to lead one to believe that their powers are unimpaired. This does not militate against the validity of the argument that impotency may be caused by bicycle riding. The total number of those questioned is but an infinitely small fraction of the total number of bicycle riders. Moreover, Nature is kind; and in addition, one of the vanities of man is his personal belief in the full sustentation of his powers, however impaired. We must draw conclusions slowly and with effort, from cases presenting themselves for treatment; cases in which any personal bias of the patient as to the causation may be neutralized by skilful cross-questioning, so that we may arrive at a correct opinion as to the inducing cause.

The writer would be obliged if physicians treating cases of impotency in bicycle riders would report their observations for the benefit of the profession.

Inquiries, it is obvious, should be directed to the positive ascertainment whether or not impotency was observable before or after commencing to ride. We may expect to find cases of this kind in those who rush to excess in bicycling, as in every-

†Gross. Vol. 11, p. 857, et. seq.

thing else. The writer believes the proper use of this vehicle to be attended by no ill results. That we see about us every day the kyphotic spine, hypertrophied legs, flat chest and peculiar facies of Round-Shouldered Robbie, the Rough Rider of the Road, are evidences of bicycle diseases and the presumption of others not so apparent.

DISCUSSION.

DR. LEE KAHN: I know of one case that came under my notice where there was an inflammation of the prostate caused by bicycle riding. Our streets in Leadville are rather rough; we have no asphalt pavements. In riding one day, one of the riders fell forward on the saddle of the wheel in some way or other, and set up one of the most severe inflammations of the prostate that I have ever seen, and I told him at the time that probably it would result in impotency hereafter. It did not seem to bother him very much at the time. I have an idea this will be the result, just as Dr. Davison has stated.

DR. LEONARD FREEMAN: I think another side of this question should be touched upon. Latent gonorrhœa (chronic gonorrhœa) probably has very much to do with prostatic inflammation and other bad results from bicycle riding and also horseback riding. It has been admitted that in the larger cities a majority of young men have gonorrhœa; and that a majority of these retain it in chronic form. In such a case as Dr. Kahn mentioned the trouble might be due to a stirring up of a chronic gonorrhœal process in the prostatic urethra. Many cases of urethral inflammation developed in bicycle riders are probably due more to a chronic gonorrhœa than to a bicycle.

DR. DAVISON: I wish to say in reply to Dr. Freeman that I do not maintain that bicycle riding is the direct cause of impotency. I expressly stated that we might look for impotency as being due indirectly to bicycle riding—that is to say that bicycle riding, by reason of the more or less jolting on improperly-made saddles, would likely stir up old diseases, particularly gonorrhœa, and might cause diseases of the prostate. I lay special stress on the improper shape of most of the saddles. The weight of the rider is thrown too much on the soft parts

instead of the ischia, as Nature intended. I have met with some cases in which I found more or less prostatitis. I have met with two or three cases in which old gonorrhœas have been re-established, and I believe, as Gross does, that a number of cases of impotency may be– in fact, are– due to gonorrhœa, stricture, enlarged prostate, etc. Therefore, I think we may expect, with the increasing number of bicycle riders, to find in time cases of impotency due directly or indirectly to bicycle riding.

ALOPECIA PREMATURA.

J. M. BLAINE, M. D., DENVER, COLO.

Alopecia prematura is that form of baldness which occurs prior to middle life, and may be either idiopathic or symptomatic.

The period in life at which alopecia prematura occurs is usually between the ages of 25 and 35. If an individual can safely pass this critical period and retain his hair intact, the chances are very favorable for him to pass on to old age without any appreciable thinning, or until the age of alopecia senilis arrives.

It is not my purpose in this paper to discuss the diagnosis of the various forms of alopecia, neither do I propose to enumerate the different diseases of the scalp and the economy in general which produce alopecia; but rather to give some ideas, old and new, regarding the idiopathic form of alopecia prematura.

In giving a *resume* on what has been written on this subject, it is not necessary that I should quote authorities, for all writers are practically of one opinion regarding what have hitherto been accepted as facts, and it is impossible to say who first promulgated these ideas.

Idiopathic alopecia prematura usually begins on the vertex and extends forward, or it may begin in front and travel backwards; less frequently than either of these, it may begin on top of the head, leaving an island or tuft of hair in front.

It is a fact worthy of note that all authorities speak of idiopathic alopecia as occurring on some part of the head; from which it is safe to infer that it never occurs on any other part of the body, or that this occurrence is so rare as not to deserve attention.

The individual hairs, as they fall out, are replaced by others of a finer caliber, which survive for a time, and then give way to others still finer, until there is nothing left but fine lanugo hairs, and when they disappear in the course of time the scalp is left bare, shining and atrophied, or tightly bound down.

The causes which lead to idiopathic alopecia prematura are predisposing and exciting. According to Pincus, there are only two predisposing causes: heredity and a diseased scalp which may have existed prior to puberty, such as eczema or impetigo. He says the latter is the more frequent predisposing cause, but my own experience leads me to the opposite conclusion. Certain it is that here, in America, baldness may easily be traced through succeeding generations.

Among modern authorities there are many things assigned as being exciting factors in the causation of this disease, but I shall only refer to a few of them; the principal ones are: The wearing of stiff and ill-ventilated hats, causing compression of the blood-vessels supplying the scalp; the daily habit of applying water to the scalp, which combines with the sebaceous matter to form an emulsion, and clogs up the hair-follicles, causing atrophy of the hair-glands.

I can not attach the importance that some do to the habit of wearing stiff hats as being a causative factor, but the habit of applying water to the scalp so frequently is certainly one that should not be encouraged.

Some authors lay great stress on the assertion that the aponeurosis of the occipito-frontalis muscle becomes stretched and causes atrophy of the hair-glands. Certain it is that this condition exists after the alopecia has taken place, but I regard this as an effect consequent upon the loss of hair, rather than the cause. If this were a cause of alopecia, it might very properly be asked: Why does this stretching take place at this particular period of life more than at any other? An excuse

for baldness is offered by some, that there is never much adipose tissue underneath the scalp, but this could not possibly be a cause so long as the proper amount of nourishment is furnished to the part.

Whether we believe the theory of Darwin as to our anthropoid ancestry, or the account given by Moses, the fact remains the same, that Nature provided the original man with hair on his head, and there can be no reason assigned for the hair failing sooner than other parts of the body, except as a result of bad and unnatural hygiene.

Heredity, which is the principal predisposing cause, I regard as the result of succeeding generations practicing the same bad hygiene.

Some ten or twelve years ago I began a series of investigations as to the chief exciting cause of alopecia prematura, and subsequent observations and researches have only served to confirm my conclusions made at that time, that the most frequent cause of premature alopecia was the drawing away of nourishment from the scalp by the frequent use of the razor on the face. It is a fact so well known as scarcely to need repetition here, that the frequent use of the razor stimulates the growth of the beard to its utmost extent; whereas, if it is allowed to grow unmolested, the growth becomes less and less each week, until at the end of six months or a year the growth is practically imperceptible.

My conclusions, therefore, are that the constant drain made on the system to supply this rapid growth of the beard draws on the supply that should go to nourish the hair on the head, and, as a result of a lack of nutrition, the hair-glands atrophy, and then the scalp becomes bound down. This theory I think is reasonable when we consider the relations existing between the blood and nerve-supply of the scalp and face. The blood-supply of the scalp and face is obtained from the external carotid artery. The facial artery branches off near the angle of the jaw, while the vessel finally terminates in the anterior and posterior temporal arteries which supply the region represented by the aponeurosis of the occipito-frontalis muscle. The nerve-

supply of this muscle is obtained from a branch of the facial nerve

If a counter-irritant applied to one part of the body will relieve a pain or an inflammation of another part which is in sympathy with it, it is certainly not going too far to believe that a constant counter-irritation kept up on the face will in time draw away from the scalp a part of its nourishment, and the hair-glands, being the last to receive their supply, are naturally the first to suffer. Clinically this theory can, I think, be demonstrated beyond a doubt.

Idiopathic alopecia prematura is almost, if not altogether, unknown among women. The reason generally assigned is that their head-gear is lighter and better ventilated and they do not have the hair clipped so often as men or use so much water on it.

The real reason for this difference, I maintain, is the fact that Nature did not provide women with a beard, hence the counter-irritation of shaving is unnecessary and the hair of the head is allowed its normal amount of nourishment.

All savage nations who practice epilation, or plucking the beard, through succeeding generations, have come to be practically a beardless race, and among all these, idiopathic premature baldness is unknown.

Dr. Holder, formerly physician to the Crow Indians in Montana, in speaking of the diseases among Indians, says: "Bald heads are unknown, even though syphilis, with its attendant alopecia, prevails. Peculiarities of hair are to be noted, its absence on the bodies, its scarcity on the genitals, its scant growth on men's faces, its luxuriant growth on their heads." (Medical Record, Vol. XLII, Page 358, 1892.)

The inhabitants of the islands of the Pacific Ocean are practically a beardless race and their heads are well covered. The Chinese are almost beardless, but are all provided with a queue, the necessary passport to a better land. The African is another example of a race with a scant beard, and among them premature baldness is unknown.

I might say, in passing, that it has been argued that the African's hair is wool, but investigations with the microscope show that it is of the same texture as the Caucasian's, except

the curl. Anyone who will take the trouble to read Prichard's "Natural History of Man" can not fail to notice this fact: That among nations where baldness is practically unknown you will either find the men have scant beards, or, on the other hand, luxuriant beards that have been allowed to grow unmolested.

I think it may be stated as a fact, without much fear of contradiction, that the Anglo-Saxon race is pre-eminently the one where baldness is most common. With all our boasted civilization and learning, with all our advances in the arts and sciences, and particularly in our rapid strides in medicine and surgery, we are the laughing-stock of the untutored savage because we are losing our hair.

There must be a reason for all this, and I believe that it is on account of our devotion to fashion and a desire to make our faces handsome at the expense of our heads.

Anyone who may wish to prove this theory for himself can do so by observing all the men who have become bald between the ages of twenty-five and thirty-five, and you will notice this fact, that at least 75 per cent. use the razor, or have used it during the hair-falling period.

On the other hand, 75 per cent. of those who have not shaved during this period have a natural amount of hair on their heads.

I do not wish to be understood as saying that shaving will produce baldness in every individual; I am only speaking of those who have a predisposition to baldness. There are many whom nature has so abundantly supplied with hair that no amount of abuse will lessen its growth.

Again, you must not confound symptomatic and idiopathic alopecia, for many men who do not shave lose their hair as a result of disease.

Another important fact that I have noticed in this connection is that persons who suffer from seborrhœa of the scalp are always worse when they shave than when the beard is allowed to grow undisturbed; another proof of the intimate relation existing between the face and scalp.

The treatment of idiopathic premature alopecia requires

the combined, persistent efforts of the physician and patient.

If a patient presents himself before much loss of hair has taken place, I always advise him, as a prophylactic measure, to stop shaving. This, in a vast majority of cases, is sufficient to arrest the further progress of the disease.

If the disease is further advanced and atrophy of the hair-glands has commenced, in addition to the above advice, I prescribe tonics, both internally and locally, together with the application of massage and electricity.

In the first stages of the disease, mild applications are all that is required, but if the disease is more advanced, active stimulation is necessary.

In all cases of alopecia, whether idiopathic or symptomatic, the use of water should be proscribed, except when it is necessary to shampoo the head for purposes of cleanliness. This should be done once every week, by the free use of equal parts of alcohol and green soap, with enough water added to make a good lather. After thoroughly cleansing the scalp, the soap should be washed off with a shower-bath and the water carefully dried from the hair by means of warm towels. If the hair is dry, a little oil or vaseline may be applied to overcome the injurious effects of the soap and water.

The prognosis in these cases is favorable. At least 75 per cent. of them may be cured, if the intelligent co-operation of the patient can be secured.

THE NERVOUS AND MENTAL DERANGEMENTS OF YOUNG WOMEN.

PROF. FRANK P. NORBURY, ST. LOUIS, MO.

The adolescent period of a woman's life offers a field for investigation but little understood and too frequently ignored by the average family physician. Viewed by the neurologist it is a kaleidoscopic picture painted on the dusk-brown background of heredity: colored by environment, with hues as varied as education, hygiene and habit can make them. Strange is the

mechanism and complicated the technique necessary to draw a picture that will adequately present the varied degrees of nervousness in young women.

Confronted as we are with disturbances varying from slight minor ailments to the perplexing and oftentimes indeterminable conditions upon which rest the most profound nervous disorders, it is evident that to solve these problems we must make a patient inquiry into all the symptoms presented. Dogmatic assertions will not unravel the subjective feelings or the querulous experiences of a nervous young woman. Hence, the family physician must be cautious, and not, through the supposed kindness of his heart, say that the troubles are insignificant.

So frequently, indeed, have I met with cases where the trusted medical adviser has, by a hasty, snap-shot diagnosis made his patient justly incredulous by his dogmatism and positiveness, that I now appeal for discriminating attention even to the most minute details, and the use of extraordinary care in the methods of diagnosis, in studying nervousness in young women.

More than cursory notice is needed to construe symptoms; they may be trifles in themselves, but when taken collectively they penetrate to the very foundation of a woman's being. In this day of "degeneration," when, as Nordau says, "there is an increase of nervous irritability far beyond that of any other time," we must be conservative in our analysis of cases. It is true, hysteria and degeneration have existed for all time; but again Nordau reminds us that we are living in a generation when vast fatigue exists, due to the discoveries and innovations bursting abruptly upon us, imposing upon this generation organic exigencies greatly surpassing its strength, thus creating favorable conditions under which these nervous maladies have gained enormously, and have even threatened civilization. Even the rural districts have felt this invasion, but it is in the great cities and college-centers that this oppression is most profound in young women. Living as I do in a college-town, I have noticed this weakened, nervous tendency in the ambitious college woman, which, undoubtedly, is a heritage of civilization It is a formidable foe, demanding from us as physicians our best efforts to confront. That heredity is the background of the pic-

ture is evident, and even the most casual observer notices what environment has to do with nourishing the hereditary spark into a flame of destruction oftentimes appalling. The secret springs of a woman's life are here depicted. The physician's training enables him to read "ichabod" upon the vaunted intellectual power and physical strength of such an individual. For Mother Nature is kind to us, but she insists upon a balance of her ledger, and to this end has established her beneficent laws of heredity. Now, by heredity I do not mean merely the transmission of family traits, features, moods, methods and racial peculiarities, but that broader, grander and more sublime law of the maintenance of the normal type of the human species. Its workings are manifested first in an evolutionary process, which has for its object the building up and the preservation of all that is good or tends to benefit the race. Second, a degenerative process which eliminates false quantities and errors, not even considering the prodigality of life or the extinction of families, oftentimes necessary in executing the purposes of the law. With these two primary principles as a basis, transmission of conditions obnoxious to the highest normal development of a human being are better understood. Unsuitable unions either of the too similar or too markedly dissimilar beings affects the developmental impetus of the germ, resulting either in imperfect evolution of the nervous system or a complexity and elaborateness of nervous development, especially of the higher nerve regions. Such complexity has with it a corresponding tendency to disorganization and dissolution. We notice in the interchangeable and the direct transmission of neuroses evidences confirming the theory of complexity being a deterioration—a part of the whole of the greater degeneration.

Such morbid heredity is due, as Fere says, to an accumulation, a capitalization, so to speak, of nervous states or conditions.

Civilization favors the production of such exceptional beings. It produces variations and defections—the provocative conditions being the result of exhaustion of nerve-force or impulse necessary to normal development. During the periods of infancy and childhood these nervous anomalies may be shown,

but it is not until the adolescent period that we see clearly the outcropping of a good or bad heredity. This period is, of all others, the most interesting in the study of nervous disease. Here we see the evolution of new functions; the hereditary potentialities commencing in earnest their warfare with environment and education; the taking on of those characteristics, nervous and mental, which are to determine, largely, the life-history of the individual.

What an important period, then, is adolescence; and carefully must the physician undertake its study, if he desires to render the most scientific service In young women the period extending from 13 to 20 is the most important in their life; it is full of dangers; then it is that the nascent instincts of her womanhood are generated and weave themselves into the web of her life. Her sexual proclivities are then evolved and the greatest of these, menstruation, is established.

This phenomenon, which is nervous in origin and periodic in character, intensely affects and modifies her life's history. T. Gaillard Thomas says that "eight-tenths of all diseases peculiar to woman begin at one of the four great epochs of her life—viz: puberty, marriage, childbirth and the menopause."

The neurologist will tell you this is also true of the nervous disorders of women. The adolescent period in woman may embrace three of these epochs viz: puberty, marriage and childbirth; hence the greater exposure to nervous disorders during this period.

Woman's normal psychology is more complex than that of man, due to her sexual characteristics; and during adolescence, mental habits which may or may not eventuate into psychoses, are inaugurated. By reason of the epochs of marriage and childbirth affecting the mental equilibrium of woman, we can understand what we have to contend with in this formative period of woman's life. Clouston has given us a thorough elaboration of the co-relation of adolescence to diseases of the mind; he shows that the mental changes incident to adolescence are due to a long heredity of civilization.

The potential affections for lover, husband and child which are evolved at this period are powerful factors which need con-

sideration far greater than is usually accorded them. Again, if the young girl enters puberty free from mal-development of her uterus and tubes and without grave functional disturbances of these organs, her sailing through the period of adolescence is likely to be smooth. If puberty is stormy, due to failure of the sexual founctions to be correctly inaugurated, it is an evil foreboding. Many minor ailments will be prominent, but what is most dreaded are the grave, nervous disturbances, such as hysteria, epilepsy and hystero-epilepsy. I have seen several such cases which I am sure were due to mal-formed ovaries or other uterine appendages. Dermoid cysts of the ovary, which may have been dormant until the period of puberty, can and do cause profound nervous symptoms. I saw, in consultation a few years ago, such a case. Surgical interference revealed a dermoid cyst of the left ovary. Goelet has called attention to the presence of fibroid tumors at this period, causing nervous disorders. Mal-development of the uterus and appendages may follow infectious diseases and be responsible for nervous disease by both the irritation from lack of development and the results of the infectious processes of the disease on the nervous system. I saw, this past winter, such a case, where both these influences combined to produce a severe and prolonged case of neurasthenia.

Overworked school-girls entering the period of puberty are doubly exposed to nervous diseases when afflicted with any of the infectious or self-limited diseases, especially scarlet fever and typhoid fever. This is to be accounted for by the previous depression and irritability of the nervous system and the subsequent intoxication from the products of the disease. Moyer has called attention to typhoid fever as a cause of true psychoses by infection. The psychoses are more frequent than the neuroses. This has been my experience, especially if the typhoid fever occurs in young girls having neuropathic history. I saw, in consultation in 1891, a young lady having some slight hereditary history of nervous disorder; age 20, single, who in the second week of typhoid fever became insane—a case of typhomania. Her maniacal excitement continued for several weeks, and life was despaired of. However, after six weeks she com-

menced to improve physically, and at the end of eleven weeks showed signs of returning reason. She made a good recovery about the end of the fourth month. This was no unusual case, excepting the development of the psychoses at the early appearance of the fever. I have had a number of such cases, all showing that the mental state was due to altered nutrition, and this due to nervous changes, the result of the infection.

It is only within recent years that clinical study has been given to this subject. Moyer says: "An examination of our clinical and autopsy records will show a deplorable lack of observation in this field." The pathology of nervous disorders is as yet in its developmental stages, so it is not to be wondered at that such negligence has been noticed. The intimacy of the nutritive, nervous and sexual systems are being studied, and so far the evidence is great showing their interdependence. The adolescent period, of all others, is the one when the integrity of these three systems should be intact. Nutrition demands it development of the sexual organs demands it, and the mental and nervous stability of the individual demands it. To insure a perfect and well-rounded physical development these three systems must be in harmony. This mutual dependence must not be interfered with.

Let us consider some of the special causes of nervousness in young women.

First Over-ambitious application in study. Pedagogues would have us believe that we are mistaken in our opposition to close application to study during the formative period of womanhood. They insist there is no crowding; no overloading of the nervous system with work, and no improper hygienic conditions to modify unfavorably the tendency toward exhaustion. My experience teaches me the contrary here in our own college community. Especially does this apply to the students of music. My observation has been considerable, but unfortunately interrupted in some cases. However, enough information has been gathered to enable me to say that music is a powerful factor in the causation of nervousness in young women. It affects the entire nervous system, which under normal conditions is beneficial, but when hampered by abnormal fatigue it intensifies the neu-

rasthenic state, and even may make it chronic. Music affects the nervous system in two ways; first, through the excito-motor fibres; second, through the inhibitory fibres. Joyful, light, exhilarating music resounds along the excito-motor fibres, while sad and lugubrious music, through the inhibitory fibres, checks and inhibits contractions. These effects, when continuous, disturb the physiological action of the heart, the lungs, and the digestion, through the sympathetic nerve.

Exhaustion is profound in some cases of nervousness in young women students of music. The mechanism is allied to that of genuine neurasthenia and is in the following order of appearance: First, over-fatigue, muscular, from long practice; second, sensory disturbance from continuous stimulation of the organ of hearing and of vision, also touch; third, the emotional control is disturbed through effect in the inhibitory centres; fourth, disturbance of sleep from abnormal fatigue; fifth, peripehral nerve disturbance, numbness and tactile perversion. The climax is represented when the hysterical state is engrafted, and then we have a well-marked case of nervousness from overwork. Tarchanoff of St. Petersburg says: "Music is a serious therapeutic agent" and that "it exercises a genuine and considerable influence over the functions of the body." I am inclined to believe its influences on the adolescent woman, when followed by exhaustion, are serious. Emmett, I believe, has said that arrested development of the ovaries and uterus can follow over-stimulation by music. Music causes over-stimulation of the sympathetic nerve; over-stimulation means exhaustion, exhaustion means mal-nutrition and mal-nutrition means mal-development. I could enlargen upon this point, but this is sufficient. I would enlist your co-operation in investigating this most potent influence in nervousness.

Other educational influences are also entitled to our consideration.

For years the writer has heard, as doubtless you all have, that certain studies should be pursued for the mental discipline they give. One educator will say the classics, another mathematics, will round out the powers of reason and give the elements so necessary to culture. The student listens to the sug-

gestions and then elects her course. If ambitious, she works assiduously to master the intracacies of language of the puzzling figures of mathematics.

The seeming well-selected course which she has taken to fill in the remaining hours of the day contribute to spur her on to hard work. The result is, she has more than she can handle without fatigue and sooner or later a break comes which leads to the inauguration of a life of nervousness.

I have repeatedly seen such cases—some, very sad ones.

Just lately I saw a young lady who was taking a four years' course in three years—a classical course—in preparation for work as a missionary in Africa. She worked from 5 A. M. until 10 P. M.—Even taking with her, books to her meals. This in a school-dormitory presided over by a matron and superintended by a well-known educator. Now the break came in her first year, continued in the second and reached its climax in the third, when the young lady became insane.

What real worth was her education? Was it not a case of culture under pressure, which means false results? The use of the classics in preparation to teach the Africans may be questioned, too. There is a great deal of truth in what Herbert Spencer says, viz: "Men dress their childrens' minds as they do their bodies, in the prevailing fashion." It strikes me there is considerable waste of time and labor in the so-called classical education. "Usefulness," says Skene, "is the chief thing to consider. Ill health is too frequently the prize drawn at graduation and no young woman is fitted to become wife or mother under such a load of nervousness."

Woman's mental training should be, as all education should be, in the line of what is to be their vocation. Physical health first, so-called culture second. The mental training and discipline can go on in development with the physical, and should go hand-in-hand with it. It is of far greater importance to woman that she be sound in body and mind than to hold the prize for Greek translation, composition, or what not. There would be less nervousness and better developed children. Nervousness in women can best be cured by having the woman well-born from such a heredity good health will come.

Now, as to other causes of nervousness we may add faulty training. I have seen cases of mental disease the direct result of the lack of enforcement of parental control. Young girls, when reaching the age of puberty, have had, perhaps, a tendency toward abnormal excitement, adventure, etc., which, if held in abeyance, would have been used toward the better development of the girl; but, allowed to run riot, has completely enveloped the womanly instincts and let the abnormal develop. A young woman shouldhave a reserve power, but if excitement, lack of rest and unusual calls upon her vitality be made, she will succumb to the inevitable and become a nervous wreck. Clark has taught us the need of rest for girls at her period, and the need of keeping quiescent her sexual tendencies. It is through the abnormal excitement growing out of promiscuous gatherings, late hours and prolonged fatigue that the hysterical girl develops. I have seen many such cases, and, say what we will, we must acknowledge the sexual element as the base of the trouble. Young women should know their own bodies and the functions of their special organs; "fore-warned, fore-armed." In many cases of hysterical insanity and allied conditions we find associated unnatural sexual excitement and gratification. I know this to be true, and I know, further, that there are many cases of hysteria occurring in young society ladies that have the same foundation. . The confessions of a society woman are not all as stated in a book by that name; there are others which we as physicians know. To prevent which we insist that parental control is imperative.

Again, we need to insist upon exercise as necessary toward the development of woman. We need to encourage it, for the lack of it is seen in the house-bound young ladies, the fashionable invalidism and the tender-sensation creatures who demand so much of the physician's time. I believe exercise imperative and welcome the introduction of the bicycle as "the thing" among the fashionable of to-day. It means a great deal, and I hope that from Newport this fad will spread to every city, hamlet, village and cross-roads in the United States. We need it, and the introduction means progress in medicine and the lessening of causes of nervous and mental disease.

In conclusion, let me say that my paper has been more the mechanism and the causes of nervous and mental disease, than the consideration of the subject as a whole. It is too great to be treated in one paper, for the symptoms and treatment each are entitled to consideration requiring more elaboration than the causes. Our literature is not very great on this phase of woman's diseases, and hence I would encourage you to contribute to it. I have in mind a compilation of cases, with a detailed study of symptoms and diagnosis, with a view of embracing the medical treatment, so as to add to the recent interest shown in medical gynecology. The neurologist must familiarize himself with such facts, so must the general practitioner. Let us work together.

EPILEPSY: ITS CAUSES AND TREATMENT.

P. R. THOMBS, M. D., PUEBLO, COLO.

There are few chronic diseases that have attracted more attention than epilepsy. Its frequency, distressing characteristics, invasion of all classes and conditions of life, and its intractable nature have all tended to surround it, in the popular mind, with a large amount of mystery and dread. To the sympathies of the medical man, in his daily rounds, nothing could appeal more effectively than the convulsed features and contorted limbs of the unfortunate victims of this disorder. Add to this a perceptible daily mental enfeeblement and irritability in a young person heretofore bright, amiable and intellectual, and we find a subject calculated to evoke our sympathy and claim our warmest attention.

Epilepsy has long been denominated a functional disease, and, as opinions differ as to what is meant by the term functional, it will be well to give the groupings and definitions of some recognized authorities.

Whittaker defines epilepsy as a chronic affection which consists of an underlying condition and characteristic paroxysmal explosions of very short duration, with varying intervals of complete absence.

Allen McLain Hamilton defines epilepsy to be nothing more nor less than a discharge of nerve energy from an over-excited, or what may be called a dynamo-pregnant nerve center or collection of centers, and the predominance of motor or sensory phenomena determines the extent and order of the parts involved.

Lasegue defines it as a chronic apyretic disease, the accesses of which are sometimes characterized by sudden loss of consciousness by tonic, followed by clonic convulsions and coma.

Gowers says the term epilepsy is applied to a disease in which there are convulsions of a certain type, or sudden loss or impairment of consciousness, but in which the convulsions are not directly due to active, organic brain disease, to reflex irritation or to abnormal blood states, and in which isolated loss of consciousness is not the result of primary failure of the heart's action.

Seguin says this formidable affection has no uniform pathology ; it is as yet only a symptom that may be produced by numerous pathological conditions ; of organic or symptomatic epilepsies some are due to encephalic disease or injury, others depend upon peripheral disease or injury, and, lastly, they may represent toxæmic conditions, as the uræmic, gouty, etc.

These are a few definitions of the disease. It will be observed that no two exactly agree, although the authorities quoted are among the foremost; and, of the above quotations from standard authors, that of Seguin, in my opinion, contains the most valuable ideas as to the conditions encountered in our dealings with this disorder.

Epilepsy must be considered as a complex symptom, arising from a multitude of causes ; it is not one disease, but may be the outcome of several diseases. Numbers of epileptics whose convulsions are due to syphilis are relieved by the exhibition of iodides and mercurials; and cases are daily benefited or cured by the intervention of the surgeon who removes a piece of depressed bone or a tumor.

The tendency of the medical profession is to seek a cause

for every effect, and to regard with suspicion every effect that has no appreciable cause. If, after failure to find some provocative agent in a case where epilepsy dates from infancy, coupled with an inherited neurotic temperament, then, I think, one should be satisfied with the term, "idiopathic;" this does not imply that some cause may or may not have been present, only that we are not able to find it.

It is true that every phimosis, scar or ingrown nail does not beget reflex cerebral disturbance, but that some other condition or idiosyncrasy must be present, in order that the conditions be fulfilled; a neuropathic tendency, inherited or acquired, is the one thing needful. This may not be present at the time the irritation commences, but may be developed as the result of the attacks.

For the immediate causation of reflex epilepsy we may have scars about the limbs, corns and callouses, ingrown nails, disorders of the genitalia, phimosis, incomplete descent of the testes. In girls, the condition of the clitoris should be ascertained. The rectum should be examined for ulcers and irritating hemorrhoids; the scalp, eyes, nose and mouth may harbor apparent trivial troubles which, under other circumstances, would pass unnoticed. Disorders of dentition, hidden fangs, caries, neoplasms in the buccal cavity, scars resulting from ulcers about the tonsils and larynx, polypi and fungous bodies in the nose and ears, an irritable ovary, dyspepsia, intestinal worms, ocular defects—in fact, whatever may infringe, directly or indirectly upon nerve trunks or filaments, may produce reflex symptomatic epilepsy.

Between reflex and traumatic epilepsy the line of demarkation should be clearly and distinctly drawn. In the latter the irritative lesion is direct and local, and the resulting convulsion is amenable, in a measure, to the surgeon's art.

In our day the domain of epilepsy has been considerably restricted; the epileptiform convulsion of parturient women, scarlatinous children, etc., have been classified elsewhere. Idiopathic and symptomatic epilepsies are admitted. It is evident that idiopathic epilepsy does not signify epilepsy without cause, but that this cause is still unknown and not yet deter-

mined. There must be functional alteration and even lesion in the nerve tissue; these lesions probably have their causes in repeated excitations belonging, very likely, to a reflex order, and probably provoked, in the majority of instances, by the action of some toxic substance either introduced into the system or produced by the system itself.

These different causes acting upon the reflex contractility of the vessels of the brain through the intermediary of the vaso-motors, produce convulsion in exciting the convulsive center of the bulb, especially in subjects hereditarily predisposed.

Vaso-motor troubles have long been noticed, and have given rise to several theories regarding the malady. The sudden pallor of the face when a vertigo is imminent, or when an attack begins, caused some to think that the whole brain became suddenly anæmic; others attributed the paleness of the face to cerebral congestion. Whatever may be the case, it is clear that under any vaso-motor influence there must be in epilepsy some trouble of the circulation of the brain, doubtless cerebral anæmia.

Mr. Fere, who has made some researches upon the subject, gives the following conclusions:

Arterial tension is increased before and during epileptic attacks, and reaches below normal when the crisis is ended, and continues below during eight or ten hours. He claims that in simple vertigo and in shocks the same results will be found, only less pronounced and less lasting. Finally, his researches have included anger outside of epilepsy, and here he arrived at the same conclusion.

Troubles of the digestive apparatus, especially the superior portion, are of a remarkable constancy in general epilepsy; their importance is the greater as they precede the attacks, permitting us to foresee and sometimes to prevent them. Dr. Voisin, of La Salpetriere, says that every time an epileptic is in imminent danger of an access, a most accentuated furred condition affects the tongue, and that, in following patients closely and examining them daily it is easy to gain the certainty that as often as this symptom appears, an epileptic manifestation is near at hand; that gastric troubles in partial epilepsy are generally wanting, but it is known that often these localized epilepsies

terminate later in general epilepsy, and that whenever this is the case the gastric troubles appear at the same time as the generalization.

Attention has been directed to gastro-intestinal phenomena by different authors. Massalongo and Pommay describe gastric epilepsy, and, while Pommay attributes the accesses to the reflex action of the excited pneumo-gastric, Massalongo recognizes the possibility of an auto-intoxication.

The study of the urinary secretion in epileptics is not less interesting nor less instructive than that of their gastro-intestinal troubles. The renal emunctory gives us some valuable hints. Since the publication of Prof. Bouchard's works, the examination of urine presents an important new point, *i. e.*, its toxicity. Experimentors have busied themselves to determine the urotoxic co-efficient of urine. After many experiments made among epileptics, the conclusion has been reached that there is hypo-toxicity before and during an attack, and that hyper-toxicity is consecutive. There would then exist a true elimination of toxines after an access.

The nerve tissues of different individuals respond differently to active drugs and toxic agents; thus, the same amount of urinary products circulating in the blood of one person that would give rise to uræmic convulsions would not have this effect upon another. Admitting that uric acid in the blood in excess is a convulsant, and we have an explanation of many cases of epilepsy.

On the unstable nerve tissue of the neurotic, the uric acid in the blood acts with certainty; on the other hand, if the nervous economy is stable the uric acid would not act so readily, and convulsions would not likely be produced. A small excess of uric acid might be sufficient in a neurotic subject to cause the nerve-discharge that produces the phenomena of an epileptic convulsion.

TREATMENT: - When one reviews the numerous medications proposed against this disease, medications that have, as a rule, proven uncertain and inefficacious, it is easy to comprehend the discouragement that has caused the verdict of incurability to be pronounced against epilepsy. But epilepsy is no longer the

morbus sacer against which the resources of our art are futile. In fact, there are few chronic diseases in which therapeutic measures have equal power; but, in order that success may be attained, the treatment must be carefully adjusted and faithfully carried out, requiring great care on the part of the physician, as well as confidence and perseverance on the part of the patient.

Some of the discrepancies of past experience in the treatment of epilepsy are surprising; for example, such great physicians as Morgagni and Schroeder von der Kalk believed counter-irritation to be an almost infallible remedy; to-day it is completely abandoned.

The study of causation is of very great importance in approaching the subject of treatment. Two distinct conditions are to be specially considered; first, an hereditary or acquired constitutional tendency which predisposes to the development of the disease; and, secondly, local disease processes which act reflexly as exciting causes.

All peripheral sources of irritation should receive careful attention, although they may lead to error in various ways; there may be a disposition to attach to them more importance than is their due, especially in gynæcological treatment so often resorted to because of the presence of nervous disease, and frequently to the detriment of the patient.

The overestimation of the importance of reflex causes of the disease is, on the other hand, liable to lead others to the opposite extreme, an equally deplorable error. Every case should be examined and treated on its merits, regardless of what may be found in other cases. The removal of the local disease must be considered as a part only of the treatment; it must be remembered that in addition we have the constitutional vice; and while the former may have been the original cause, the latter may have gained an independent existence.

Attention should be paid to the diet of epileptics, aside from the gastric irritation produced from the ingestion of heavy or indigestible food. It has been shown that an animal and highly nitrogenous diet increases the acidity of the urine and lowers the alkalescence of the blood.

Londois, in his work on physiology, says that a vegetable

diet renders the urine alkaline, and increases the alkalinity of the blood. This would increase the power of the blood to hold uric acid in solution.

It is not probable that all victims of epilepsy suffer from an excess of uric acid in the blood and tissues of the body, but I think a very considerable portion of the cases are related to uric acid diathesis, and that the production of this agent can be limited to normal amount by a regulated diet.

The number of anti-epileptic drugs resorted to in the treatment of chronic epilepsy has been very great. Of those which have been reported upon before the time when the bromides came into use, the most prominent are oxide of zinc, nitrate of silver, digitalis and belladonna. Digitalis is of value in cases of weak heart and feeble circulation. Belladonna is much used, and is a valuable adjunct to the bromide treatment. The action of the bromide of potassium has been well studied; all physiologists agree that it acts as a sedative upon the cerebro-spinal axis, and in particular upon the bulb. There can be no question, I think, but that its primitive depressive action upon the excito-motor power of the meso-cephale applies itself marvelously to epilepsy. It enables physicians to obtain a control of the disease hitherto unknown. That it has not gained greater success is because of the frequent lax methods of prescribing, and want of perseverance on the part of patients. The dose which may be administered daily varies greatly; each case is to be individualized; some bear small doses badly, while others will take four or five drachms daily for an indefinite period. It is well to commence with fifteen to twenty grains, and increase progressively until the access disappears. Two things should limit the dose, the control of the disease, or the production of bromism. After reaching the maximum that is well borne, or that holds the disease in check, it should be continued at this dose for a long time; after the convulsion has ceased it should still be continued, and may be prolonged for an indefinite time; but, when the disappearance of the attack has been effected the dose can be gradually lowered. In cases where the nutrition becomes impaired the use of cod liver oil, iron and other tonics will generally assist us over the difficulty. There are few who

cannot bear the medicine if care be taken in its administration.

With reference to the surgical treatment of epilepsy, it is comprised chiefly of operations about the head. Trephining for epilepsy is one of the oldest operations of surgery; at one time it was much resorted to in all intractable cases, but these indiscriminate operations brought it into disrepute, and so for a long time it fell almost into disuse. The greater proportion of cases in which trephining is resorted to are cases of traumatic epilepsy, cases in which there are circumscribed lesions, whose seat can be determined, the object of the operation being the removal of the source of irritation,—the excision of the entire diseased area.

The cases that appear most favorable for a cure are those cases where the disease is of the Jacksonian type. There is a greater probability in these cases that the lesion is circumscribed, and can be found, and that the disorder has not become engrafted upon the system to a degree to retain its existence after the cause is removed. It is probable that it is because of this latter condition that the convulsions often continue after operations.

For non-traumatic epilepsy, trephining should only be undertaken in cases of the Jacksonian type. It may be taken for granted that a lesion, whether demonstrable or not, exists in the motor area of the member in which the spasm begins.

The advisability of a cerebral operation for epilepsy resolves itself into the question as to whether the disease is due to a fracture, or a growth that can be reached. It is sometimes a serious matter to decide whether to trephine or not; but, if by looking forward a short time you can foresee a dementia that is sure to develop, then, I think, that any surgical interference that has ever proven beneficial, is permissible.

DISCUSSION.

DR. ESKRIDGE: It seems to me the points made by the essayist, that epilepsy is not a disease, cannot be too strongly urged. Instead of being a disease, it is simply a symptom or an indication of a condition. It seems to me that the true pathology of epilepsy is a weakened and irritated condition of the cor-

tical centers of the brain. Whatever tends to make these cells weak, whatever tends to lessen their normal stability, has a tendency to produce epilepsy. No one has done more in the line of the study and investigation of epileptics than Dr. Hughlings Jackson. It is to him that we owe the recognition of what he has termed the three centers, the sub-Rolandic, the Rolandic and the highest center, the pre-Rolandic. We have the three centers that preside over reflex action. The superior centers invariably control the inferior ones; therefore we may have an irritant to the lower centers that would produce epilepsy were it not for the inhibitory influence of the highest center. These conditions have to last until the superior centers are exhausted, and their inhibitory influence is weakened before the epileptic habit can take place. This is one of the explanations of the length of time that elapses after an injury to the head or after a cause which is known to produce epilepsy, becomes active, before the epilepsy develops. Whenever the lesion occurs in the superior center and produces convulsions, epilepsy almost immediately follows after the accident. When the injury has been to the middle or the inferior centers, the length of time, as a rule, that elapses is greater or less, depending upon the character and extent of the irritation. It seems to me that it will be much simpler for us to treat the trouble if we do so by regarding the epileptic habit as a symptom of a disordered condition rather than as a disease itself. Now in regard to treatment, if we cannot remove the cause, about the only thing that remains to be done is to strengthen the weakened cortical cells and lessen their irritability. We know that certain foods increase the irritability of the brain; generally among these are the animal articles of the dietary, and especially of these are the stronger meats, foremost of which is beef. One has to try the effect of dieting upon the effects of epilepsy. If I had to treat epilepsy without dieting and with medicine, or with dieting and without medicine, I should infinitely prefer dieting. I have taken case after case, and found that the epileptic seizures could be gradually lessened by a process of dieting, excluding animal matter, if possible, and giving them a free diet of vegetables, especially of the green vegetables; fish, oysters and eggs are allowable.

All cases of epilepsy are not benefited by restricting the diet, but a great many are greatly improved, and some are almost entirely cured, especially those that depend largely upon the conditions which Haig has done so much to illustrate, the condition which he has termed, but probably wrongfully, "uric acidemia."

The bromides in some form are about the only reliable agents that we have to lessen the irritability of the cortical cells. The safer one, the one that, in the majority of instances, seems to aid about as well as any of the others, is strontium bromide, and, in a great many cases, when the bromides of sodium and potassium both fail, the bromide of strontium acts well. It does not produce acne to that extent which the other bromides do. Of all the bromides, the bromide of strontium and that of sodium are the best treatment of epilepsy. However, I have found the bromide of sodium to succeed when strontium has failed. I have never been able to satisfy myself that a combination of all the bromides, or four or five of them, is superior to either sodium or strontium salt. Occasionally antipyrine may be added to the bromide treatment with advantage.

DR. BURNS: I would like to say a word on gastro-intestinal disturbances. A short time ago, in reading on this subject under the head of causes, dyspepsia was given with a question-mark after it. Gastro-intestinal disturbances are apparently a predisposing cause, for the reason that in children gastro-intestinal disturbances and attacks of epilepsy are more frequent than in adults. Again, before attacks, as a rule, there is an increase of appetite and constipation. Under treatment, gastro-intestinal disturbance should be thought of; and it would be a good idea at the beginning - that is, when the patient is feeling the first initial symptom of an attack - to give a large enema of three or four quarts of water and a cathartic, to thoroughly cleanse the bowels. I have used these enemata in one or two cases, and they seemed to ward off the attacks, *i. e.*, keep them farther apart.

DR. THOMBS: I have nothing to say except in regard to dieting; I think a great deal can be done in that way. I have

also tried the different bromides, and strontium among them, as Dr. Eskridge remarks. I have had the best success with the bromide of sodium. I have a record of some cases that have been discharged from the asylum at Pueblo, young patients suffering from epilepsy for the past five years, and I have not heard of any return of the seizures. I merely mention this to show that the cases do get well.

A CASE OF MYXŒDEMA.

W. J. ROTHWELL, M. D., DENVER.

On the 10th of last February Mr. B. of Louisville, Colo., called at my office for advice and treatment.

He was in middle life, of medium stature and apparently very fleshy. His family history was good and his personal record clear, excepting a severe attack of typhoid fever four years before.

He complained that although daily gaining in flesh he was losing physical strength and dexterity, and becoming more and more incapable of earning a livelihood by manual labor.

He was also aware of a growing mental apathy. He was dull and drowsy by day, but his nights were restless and often sleepless. His chief cause of complaint, however, was a distressing sense of coldness, unrelieved by extra clothing or by artificial heat.

A careful physical examination revealed no organic disease of his liver, lungs, heart or kidneys. Both the axillary and sublingual temperatures were subnormal (97° Fahr.), and the pulsations and respirations diminished in frequency and volume.

The objective signs were marked and characteristic. His face was large, round "full-mooned." Thick and ædematous eyelids covered his apparently half-closed eyes. The eyebrows were very much arched, as if striving to keep his sleepy eyes from closing. The cilia and supercilia were sparse, dry and deformed. His nose was large, flat and broad; his lips thick and everted. The cheeks were swollen and had a rosy areola

over each malar bone. These modifications of the face imparted to it a very characteristic expression of passiveness and stupidity.

The skin was slightly jaundiced, cold, dry, hard and furfuraceous. The coldness and dryness of the skin were very striking. The patient claimed he had not perspired for months.

The hair was dry, wiry and scanty; the scalp dry and scaly; the nails striated and cracked.

The whole integumentary surface presented the general appearance of anasarca, and yet it did not pit on pressure, but, on the contrary, felt firm and elastic.

The feet were enlarged and pachydermatous; the hands thick and spade-shaped; the fingers plump and large, resembling sausages.

The muscular system showed marked impairment; while its strength was not perceptibly diminished, any delicate manipulations were difficult or impossible, the patient being unable to pick up a pin or even a dime from the floor. For a similar reason his walk was slow and somewhat unsteady. Movement of every kind was disagreeable to him—not from weakness, but from an overmastering physical legarthy.

Mr. B.'s mental powers were likewise involved in the general deterioration,— not in the sphere of reason, but in that of memory and ideation. His speech was slow and hesitating; his voice low, monotonous and hoarse.

General sensibility was fairly well preserved, though a slight analgesia of the surface was discernible on careful testing. The superficial and deep reflexes were normal, excepting the patellar-tendon reflex, which was somewhat enfeebled.

The thyroid gland was completely atrophied. I could find no trace of it by the most careful palpation.

As this group of symptoms rendered the diagnosis of myxœdema evident, Park, Davis & Co.'s thyroid extract was prescribed in doses of 5 grains, t. i. d., after meals. Ordinary hygienic directions were given, but no other medicine prescribed, as I wished to test the thyroid treatment.

Mr. B. did not return to my office until February 25, as he lives some distance from Denver. He was then very materially improved. The sub-cutaneous infiltration had literally melted

away. He had lost twenty pounds in weight. The skin felt warm and moist, and the temperature had risen to the normal standard. The epidermis was exfoliating on both hands and feet. The headache and insomnia were relieved, the physical and mental lethargy had abated, and his hands were gaining their wonted dexterity. While taking fifteen grains of the extract daily he had tachycardia, abdominal colic and polyuria symptoms of slight intoxication. The dosage was therefore reduced to three grains three times daily, after meals. It has been observed that when improvement has begun, small doses are sufficient to continue the cure.

Mr. B.'s next visit was on March 10. At that time the reduction in weight from the beginning of treatment was thirty pounds. His condition was then normal. Since, in this disease, the function of the thyroid gland is completely abolished, it is necessary to continue the remedy in physiological doses for the rest of the patient's lifetime. If it be discontinued, relapse will occur, and such relapse is usually fatal. This dosage is determined for each patient by carefully watching the effects of treatment and finding the minimum quantity which will keep his tissues free from the deposit of mucin. In Mr. B.'s case, one grain of the extract three times a day is all that is required.

What, it may be asked, was the cause of the disease in this case? The function of the gland was probably destroyed by an infectious thyroiditis following the attack of typhoid fever a few years before. Dr. Sogues states (5th volume, "Triate de Medicine) that infectious diseases are sometimes followed by inflammation of the thyroid. The Clinical Society of London reports several cases of myxœdema following acute articular rheumatism, Mendal has seen it develop after facial erysipelas. Koehler mentions a case of syphilitic origin, which was cured by the use of potassium iodide.

Physiology has not shed much light upon the chemical composition and physiological action of the thyroid secretion. It seems to be indispensible to the proper nutrition of the blood and the nervous system. Both of these tissues languish when the supply is cut off. It must likewise play the chief role in the transformation of mucinoid materials, for when the function

of the gland is suppressed, either by atrophy or extirpation, the tissues become infiltrated with mucin. It is very encouraging to reflect that while a few years ago nothing was known of the pathology or treatment of this peculiar affection, to-day we are thoroughly familiar with its gross pathology, and its treatment is as certain and satisfactory as any other in the whole domain of therapeutics.

TOXIC PARAPLEGIA.

E. R. AXTELL, M. D., DENVER, COLO.

The case which I report to-day was not seen by me until all lesions of the paraplegia had disappeared. I give you his history as he gave it to me and make no apologies for presenting it under such circumstances, as it still presents features of interest and is a history which can well engage our attention for a short time. Many parts of his history are incomplete, as he left Denver before I had the opportunity of studying his case as I should like to have done.

William A., 23, from Missouri, painter, single, came to Colorado thirteen years ago. He came to me because of an open sore on the inner side of his right leg. After giving me a short history of paralysis, I obtained from him the following: His father died at the age of 44, of paralysis, which patient believes to have been an apoplectic stroke. He was paralyzed for six weeks before he died. His mother, one sister and two brothers are living and well. One sister died of pneumonia. There is no consumption in the family. Patient is the oldest child.

As a child he was well and strong, and he had but few of the diseases of childhood. As a boy he enjoyed good health. When about 8 years of age he began drinking strong liquor. His father was a saloon-keeper and he allowed patient to indulge in liquor whenever he wanted it. He seemed to have a taste for it and even before twelve years of age he had been on many a spree. Since he began making money, at about twelve, all of his money has gone for strong drink. He has been drunk a

great number of times. He took liquor whenever he could get it and often drank on an empty stomach. When he could get whisky he drank that, but when he got hard up he bought alcohol and diluted it one-half and drank it instead. There have been months when he was never from under the influence of alcohol. When he sprees it never leaves him with any ill-effects, as he can go right to work.

At 9 years of age he began smoking cigarettes and until his paralysis he smoked from ten to forty cigarettes every day. He not only smoked all day, but he smoked after going to bed and after awakening in the morning and, occasionally on awakening during the night. He has never used opium nor other narcotics. He denies syphilis. He has been exposed, but he has never had any sore.

He began painting three and a half years ago. He worked at this for eighteen months when his attack of paralysis occurred. Three weeks before this he got quite wet. The attack was preceded for two weeks by sharp, constant pain in the small of the back, and by numb, tingling feeling in the legs and arms, with much tenderness of these parts. This array of symptoms progressively increased, and he went to bed one night in January, 1892, feeling rather poorly, and the next morning he found himself paralyzed in both arms and legs, with, as he says, complete loss of sensation in these parts, especially marked in the legs.

He says he could move his head, face and tongue. He could not pass his urine nor fæces and they had to be attended to by a physician. For two weeks he lay paralyzed, without being able to move a muscle of his extremities. A little motion then returned to his right hand and soon to his right arm. In another week he was able to use his left arm to a slight extent. For two months he was unable to move his legs. Then he began to move his toes. Slowly he became able to move all parts. The bladder and bowels began recovering in nine days, but remained partially affected for several weeks in that he would have a little difficulty in holding liquid fæces, and water would flow from bladder very quickly if nature's call was not promptly attended to.

He was in bed altogether for over four months. He was then able to be up on crutches. In six weeks he was able to walk well. During his paralysis the only pain he suffered was from sharp, constant burning pain over the anterior surface of both thighs and near shoulders. With the pain he had much tenderness to pressure in the paralyzed parts.

While paralyzed, he noticed that both legs were swollen, and that the veins of the legs and abdomen were prominent. This he had not noticed before his paralysis. Soon after being able to walk around, the legs being still swollen, he scratched the inner surface of the right leg and a large sore developed. This remained an open sore until three months ago. It then healed and his present sore began a month ago.

The swelling of the legs still continues. It goes down during the night, to return after he is on his feet for some little time.

In July, 1893, the right leg drew up one night and remained stiff and sore for one week, when it became normal again. Concerning this trouble patient is very indefinite and tells his story as though he were not sure of his ground. In a similar manner he tells of some fainting attacks which he has had since his paralysis.

His physical state at present is excellent (this in March, 1894). He sleeps well, has a good appetite, his bowels are regular, he has no cough and he passes his urine all right. The pulse is 72 and the temperature is normal. He has returned to his liquor habit and his cigarette smoking, but he is using both articles very moderately.

The physical examination at this time, almost two years after his attack of paralysis, is as follows: On inside of right leg, in the middle half, there exists a dry, crusted sore, the size of a half-dollar. Below this is a scar of his old sore. On the left leg he has a few scars which, he says, are also due to sores which he has had.

Veins of both legs and thighs are varicose. On abdomen, especially on right side, the superficial epigastric is very large and prominent.

There is no ataxia of arms, legs or chest muscles. The muscular power of leg, arm and neck muscles is good.

The patellar reflex is exaggerated on both sides. There is no ankle-clonus. The plantar, cremasteric, lower and upper abdominal reflexes are greatly exaggerated.

The deep reflexes of arms and forearms are slightly increased. The masseter reflex is absent. Measurements show no difference between the two sides.

The tactile, temperature, pain, posture, localization, joint and muscular senses are now normal over all parts of the body, including the external generative organs.

Eyes: Right can only appreciate light and darkness. When a very small boy he had the right eye injured by a lead pencil and he has never been able to see with this eye since. He presents an opacity of the lens in this eye. When he directs his attention to an object just in front of him he turns this right eye sharply to the right and uses the outer quadrant. Left, $V = \frac{20}{30}$? Fields normal, fundus normal. Hearing: watch, right, twenty inches; left, three inches. Tuning-fork heard better in left ear. Smell equal and normal. Taste normal and equal.

Lungs and heart normal. Liver dullness slightly diminished. No roughening felt on anterior edge of this organ.

Urine of a light, amber color, faint urinary odor, specific gravity 10.24, faintly alkaline in reaction, no albumen, no sugar. Phosphates deposit on heating.

No blue line on the gums.

Our examination to-day shows almost a well man. The examination of his nervous system shows only an array of exaggerated reflexes. It is sometimes of great advantage to study a disease long after the disease has disappeared. That is our privilege here.

This young man was subjected to the influence of three poisons,—alcohol, tobacco and lead. In addition to these acting causes, he was exposed to the influence of cold. For three weeks he suffered with sharp, constant pain in the small of the back and had numb, tingling feelings in the legs and arms, attended with some pain. He became suddenly paralyzed, accord-

ing to his statement, but from the fact that he had been drinking very freely before his attack he might have had a number of localized paralyses before paralysis became noticeable to him.

In distribution his paralysis was paraplegic. In cause it was apparently toxic.

By paraglegia we mean a symptom, not a disease. Formerly, the term was limited to paralysis of the lower and caudal portions of the body, but now we apply the term to a paralysis involving any transverse section of the body. When the upper extremities are involved the term "cervical paraplegia" is applied.

A complete and proper study of paraplegia involves a consideration of many things—the localization of function, of nerves, cord and brain, the nature of the pathological process producing functional impairment, variations which occur from involvement of different segments and the study of the symptoms which may follow the pathological cause.

As a symptom, paraplegia forms a center around which we may class many diseases of the nervous system, most of them of spinal origin but including some cerebral and peripheral nervous affections.

Seeing this patient after his recovery and carefully reviewing his history, I believe that he had at the time of his paralysis, multiple neuritis with dorso-lumbar myelitis or a paraplegia of toxic origin.

Paraplegia dependent upon the ingestion of toxic substances is to-day recognized as a primary peripheral neuritis. Formerly it was regarded as a spinal-cord affection. Some discussion is still going on concerning this question. We have many causes for a toxic paraplegia. The poison may be ptomainic, leucomainic, mineral or vegetable. Lead, arsenic, silver and alcohol are the most frequent causes.

These poisons circulating in the blood act on the peripheral nerves, probably because these nerves are farthest removed from the vital and nutritional energy of those cells of which they are part and from which their vitality is derived. The affection is symmetrical because the nerves of both sides

possess the same characteristic behavior to the toxic agent.

With the ingestion of alcohol, an exposure to cold often co-operates as well as insufficient nourishment.

Paraplegia due to toxic agents was formerly thought to depend in every instance upon a disease of the spinal cord, but careful examination of the spinal cord in such cases failed to find disease there and it was only after modern researches that the trouble was located in the peripheral nerves. It was a great advance in pathology. During the disease our patient had the connective tissue sheaths of his nerves infiltrated with lymphoid cells—leucocytes; the blood vessels of the nerves were dilated, the myelin of the nerve fibres was compressed; the lymphoid cells increased in number, the myelin was further compressed and the axis cylinders began to suffer. The process of axis cylinder destruction can be summed up in the words, "fatty degeneration."

In peripheral nerves the various changes which occur seem to progress from the primary lesion to the periphery. The process seems to be one of slow inflammation. From the starting point of the process the changes progress. If the inflammation be severe, the intra-muscular nerve endings become involved. This is evidenced by the loss of faradic irritability in the muscles. After the process ceases, regeneration begins. It is a slow process, and in this man it took over five months for the axis cylinders to be regenerated.

From Ranvier's study, the process of regeneration always occurs by the growth of new axis cylinders from the central end of the nerve. These ultimately become covered with myelin. One or more new fibres may spring from each central fibre, and these may sub-divide. Some of them may achieve functional permanence, some may be removed.

In studying paraplegia we may divide the subject into three main divisions: peripheral, spinal and intra-cranial or cerebral.

A cerebral paraplegia must be a rare event. The motor-tracts diverge so much in the cerebrum that it would require a large lesion to effect both at the same time. It is possible, however, to have a tumor develop in the longitudinal fissure,

between the hemispheres, and, by pressure or extension, involve the motor areas for the legs in each hemisphere. This would produce a symmetrical as well as a bi-lateral paralysis of the legs, giving us a cerebral paraplegia. Again, intra-cranial tumors by pressure upon the crura and pyramidal tracts in the pons and medulla or in the cerebellum may produce paraplegia, but such tumors are rare. Most lesions producing paraplegia are of spinal-cord origin. A myelitis affecting the entire transverse area of the cord, a meningitis or meningo-myelitis involving the sensory and motor nerve-roots, all produce paraplegia, as would compression of the cauda-equina within the spinal canal.

Let us consider this case in our study of a spinal paraplegia. The patient was paralyzed in all four extremities. To produce such an effect, an organic spinal-cord lesion would have to be located in the cervical region. An acute, transverse cervical myelitis would give such a paraplegia. With such a lesion, however, we would have had, beside the motor, sensory and trophic disturbances noted in this case, vasomotor, pupillary, cardiac and respiratory disturbances, with painful rigidity of the cervical muscles. None of these disturbances were reported. The fact that the patient so perfectly recovered, is opposed to such a diagnosis. We can exclude a cervical meningitis, because the patient had no symptoms of such a condition, no lancinating pains, no constrictive bands, no muscular rigidity. It was certainly not a polio-myelitis, for his complete recovery, and the fact that he has not a single wasted muscle, shows that there was no destruction of the cells of the anterior cornu.

Beside paraplegia of cerebral origin and those due to diseases of the spinal cord, we have those of peripheral origin. This is our multiple neuritis. It is characterized by paralysis of motion and sensation, involving all of the extremities. It is a disease attended with pain, hyperæsthesia, tenderness of the nerve-trunks to pressure, trophic changes in the muscles producing the reaction of degeneration, œdema of the extremities, all unattended with visceral disturbance and a sense of a constrictive band.

Of the functional diseases producing paraplegia, we have hysterical paraplegia, paraplegia dependent upon Idea, and malarial or intermittent paraplegia.

With multiple neuritis, we frequently have some involvement of the cord. In fact, in this disease, interference with the functions of the bladder and bowel may be regarded as evidence that the morbid changes are not limited to the nerves, but involve the spinal cord itself. In our patient, with all the symptoms of multiple neuritis, we had a disturbance of both the bladder and bowel. In many alcoholic cases of multiple neuritis, chronic myelitis in irregular disseminated areas is the chief change found in the cord. In this patient I believe the change to have been a limited meningo-myelitis of rather an acute character. The rapidity of its onset and the pain in the back cause me to so regard it. His present increased knee-jerks indicate that the process was most intense above the origin of the second, third and fourth lumbar nerves.

Differentiating his trouble from hysterical paraplegia requires much care. We have, however, the following reasons for believing it organic: The prominent acting cause, the fact that the patient is of a very phlegmatic disposition, that he had with his trouble trophic disturbances of bladder and bowel, and that he had no sudden variations in the intensity and distribution of the paralysis. Hysterical paraplegia can not be absolutely excluded at this date, but it probably was not a functional affair.

The consideration of spinal paraplegia as a whole is an interesting study and involves the localizing of the cord lesion. This localization is not difficult if the topographical anatomy of the nervous system is well known. If we had some compression of the cauda equina within the spinal canal we would have paraplegia, but with this we would have many of the phenomena observed in multiple neuritis, motor, sensory and trophic disturbances in the part supplied by the nerves involved.

We also have motor, sensory and trophic disturbances when the lesion is in the spinal cord. Such a lesion must involve both motor and sensory tracts and not only these, but the anterior cornua in the cervical and lumbar enlargements, for

lesions between these enlargements do not produce the trophic disturbances as muscular atrophy, although voluntary power and sensation may be lost. An example of this form of paraplegia is seen in transverse dorsal myelitis.

We can conceive of a paraplegia unaccompanied by loss of sensation. In such a case the meningitis or myelitis present remains limited to the anterior portion of the cord or to the anterior horns, and the sensory tracts escape implication. Such a process affecting the cervical enlargement of the cord might produce paralysis of both arms and leave the lower extremities free. They would remain so, as long as the inflammatory state did not extend deeply enough to involve the pyramidal tracts in the lateral columns. When it did, the lower extremities would be paralyzed, but their sensation would be normal and they would present no muscular atrophy. Even if the cervical enlargement presented a transverse lesion, there would be no degenerative atrophy in the lower extremities.

Lesions low down in the cord interfere with the functions of the bladder, the rectum, the sexual and vaso-motor apparatus and this serves as an aid to localization. The bladder and rectum have two sets of muscles, opposed to each other in action, the detrusors which expel the excretions and the sphincters which oppose expulsion. These muscles are controlled by centers in the spinal cord in the lumbar region, somewhere between the origin of the second and fifth sacral nerves. A reflex arc is established through sensory fibres in the mucous membrane and muscles of the organs spoken of. The local nervous apparatus in the walls of the bladder and bowel probably constitute a reflex apparatus between their mucous membrane and the subjacent muscular, glandular and vascular parts.

A certain amount of control is had over the opposing muscles of the bladder and bowel. Through the posterior columns of the cord there are sensory connections with the brain and through the pyramidal tracts, probably, there is the voluntary path. As our patient had retention of urine early in his trouble let us follow up its significance.

When a lesion above the spinal center cuts off the sensory impression from these organs to the brain, there is no

consciousness of the necessity of micturition and retention results. If the pyramidal tracts are destroyed, voluntary impressions are interrupted and then the patient is conscious of the necessity, but has inability to resist the expulsion. Retention results, but the patient is conscious of it. If both paths are cut off, voluntary and unconscious evacuations occur. If the motor center itself is destroyed, the expulsive power and the power of the sphincters are lost and the retention of the excretion results, except for the mechanical expulsion by the dribbling of urine. The explanation of the bladder symptoms in this case is that the meningitis present about the lumbar cord interfered, by irritation alone, with the posterior columns and the patient was not conscious of a full bladder and hence he had retention. On the subsiding of the inflammation the condition passed away.

His exaggerated reflexes to-day may depend upon some remnant of his myelitis, but it is more probably dependent upon his present habits.

A chronic myelitis is very apt to develop in this patient and to cause him serious trouble.

DISCUSSION.

DR. ESKRIDGE: The paper is certainly worthy of discussion. It seems to me the essayist is undoubtedly right in regarding this case as one of toxic paraplegia. My own opinion is that all cases of acute paraplegia, of spinal or neuritic origin, are due to toxicity, except those of traumatic origin. It is an exceedingly interesting case and well reported.

PSEUDO-HYPERTROPHIC MUSCULAR PARALYSIS.

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I wish to present a case of pseudo-hypertrophic muscular paralysis.

This boy was first seen by me at my clinic at the Gross College about one year ago. His condition at that time was vir-

tually as at present. He is 15 years old. An Italian. Came to America at the age of 10 years. I have been unable to elicit anything of an intelligent family history. Has never had any acute illness.

At the age of about 1 year, when he began to walk, it was noticed that very trivial obstacles would cause him to fall and it was with difficulty that he could regain his standing posture. At the age of 4 or 5 years it was noticed that the calves were developing out of proportion to the other parts. The disease has been steadily progressing, so that the characteristic changes are no longer limited. The hypertrophy, however, is still most marked in the calves, but the muscles of the thighs, back, arms and thorax give evidence of the onward march of the disease Standing, you will note the increased lumbar concavity (lordasis). This brings the head and shoulders back, so that the center of gravity falls in a line corresponding to the base of support. In health it should fall in a line slightly in front of this point, and the hips and knees not so fully extended. That this is due to weakness of the extensors of the thigh is evidenced by the fact that it disappears as he sits down. In walking, the peculiar swaying movements that belong to this disease are quite apparent. In this motion he keeps the center of gravity over the base of support, which is the foot resting upon the floor, while the other one is brought forward with a swinging motion, which is also due to weakness of the same muscles.

The most characteristic movements in this disease are brought out as the patient assumes the standing from the hand-knee posture. In health he would naturally first bring his body into the erect posture as if to sit on his heels, the toes resting upon the floor; and then, as if to balance himself on his toes, he would literally spring into standing. But here, from the weakened condition of the extensors of the hip and knee, he is made unable to assume the squatting or sitting posture, and he throws the bulk of his weight on his hands and arms by getting his feet on the floor. Then he takes the work off the lower extremities and extensors by supporting himself with his hands placed upon his legs, or, as has been said, he "climbs up

his legs," and finally, by a little extra exertion, pushes himself into standing.

Upon palpation it will be noted that the hypertrophied muscles feel more like masses of fat than true muscle. The knee-jerk from muscular weakness is absent. Response to the electric current in these cases is absent only after marked weakness has occurred. I have not had the opportunity to test this subject. The mental faculties seem to be quite normal. Gowers states, that the mental development is generally beyond that of other subjects of like age. This he attributes to the indirect influence of the malady, withdrawing them from active amusements, and says that mental defect is a grave complication.

Beyond heredity, very little is known concerning the cause of this disease. It usually develops before the tenth year. Gowers states that while it is congenital, it is not hereditary. In this he is an exception. Most cases have had antecedents. Males are attacked most frequently—the proportion, according to Dana, being as three is to five. It is usually transmitted from the mother's side.

Eulenberg says that, as seen by the naked eye, fragments of muscle removed from the living subjects, and the general mass of muscle removed after death appear discolored, pale, and, in advanced cases, of a faint, light-reddish tint. In parts where the disease has made great progress, the consistence is soft, inelastic, doughy, and the cut surfaces exhibit an exquisite fatty lustre. Muscles that have not been hypertrophied resemble those of progressive muscular atrophy. Microscopically, there is first a stage of connective tissue development. This springs from the adventitia of the small vessels, and appears to be especially rich in small-celled elements and neuclei, which undergo secondary transformation into fat-cells. There have been no changes found in the nervous system that could not be attributed to a result, rather than a cause of the disease.

Says Dana, the disease runs a chronic but variable course. Its progress at first is slow. After walking becomes impossible it is more likely to progress more rapidly. It usually lasts from ten to twenty-five years, the patients dying of some intercurrent disease. They are especially liable to chronic lung disease.

Treatment has, in some cases, seemed to have accomplished some good. Electricity and massage are thought most of. In this case no treatment has been given a fair trial, as the patient was lost sight of for a period of ten months.

Probably the first case of this disease was recorded in 1838, but the description given being indefinite, it remained for Duchenne, in 1861, to note its characteristics. Soon after that, Greisinger microscopically examined excised portions of muscle and noted the contrast between it and the healthy. The first autopsy was reported by Eulenberg and Chrishim in 1866.

DIAGNOSIS OF CHRONIC ABSCESS OF THE BRAIN.

J. T. ESKRIDGE, M. D., DENVER, COLO.

Chronic abscess of the brain may, for the sake of convenience of description, be divided in two varieties. The one is the result of acute or sub-acute focal intra-cranial suppuration, in which the symptoms have become more or less latent; while the other begins with symptoms so illy defined and unobtrusive as scarcely to attract attention, if, indeed, they do not escape observation entirely during the early stage of the morbid process. It would aid in preventing confusion in the study of abscess of the brain if all those cases that begin with more or less pronounced cerebral symptoms, and continue with unmistakable and progressive signs of brain disorder, were regarded as acute or sub-acute, no matter what may be the duration of their course. It may be argued that it would be more definite to call those abscesses of the brain that begin with acute or sub-acute symptoms and are followed by a latent period, as latent, leaving the term "chronic" to apply only to those whose early period is insidious. It does not matter much which course is followed, so that it is distinctly understood what is meant to be conveyed by the word "chronic" as employed to designate certain varieties of abscess of the brain. A chronic abscess is essentially latent from its commencement to the beginning of its terminal period, and the so-called latent abscess is usually one whose duration is more or less prolonged. An abscess of the

brain whose early symptoms have been so unobtrusive as to place it in the category of the chronic variety, may run a much shorter course than the one ushered in by pronounced symptoms and followed by a latent period.

Wide differences of opinion are held to-day by physicians and surgeons of recognized ability regarding the difficulties encountered in the diagnosis of chronic abscess of the brain. Much of this discrepancy is due, it seems to me, to many accepting all intra-cranial suppuration as the result of an acute process. At the Surgical Congress held in Berlin, April 17, 1895, the distinguished surgeon, Professor von Bergmann, in a paper entitled "Progressive Cerebral Surgery," stated: "Cerebral abscess must always be operated on. Its diagnosis is easy if the etiology is considered. The principal cause of cerebral abscess is inflammation of the middle ear; it is usually situated in the temporal lobe." Leube, than whom few have attained to greater distinction as a careful and painstaking diagnostician, says: "The diagnosis of sub-acute and chronic abscess of the brain is, on the whole, easy." According to Professor Murri, "he" (Leube) "gives the most important indications of cerebral abscess, intermittent fever associated with rigors, and attributes great value to the absence of optic neuritis and etiological considerations." (Lancet, January 12, 1895.)

Gowers, in his work on diseases of the nervous system, begins the paragraph on diagnosis of cerebral abscess with, "The extreme variability and frequent latency of the course of cerebral abscess often render its diagnosis difficult and even impossible."

Spitzka, in Pepper's System of Medicine, after making the statement that "there is little difficulty in recognizing the existence of cerebral abscess in which well-marked focal and constitutional symptoms coincide, or where a distinct abscess-producing cause, such as an ear trouble, a head injury, or a putrid bronchiectasis coexists," adds, "but there are a number of cases, varying from the latent form to forms with obscure general symptoms, whose recognition is impossible, or, at best, a matter of conjecture." (Vol. V, p. 799.)

Professor Murri states, that Martius has made a study of seventeen cases of cerebral abscess occurring in the German hospitals during the past few years, and not one of them was recognized during life. (Lancet, January 5, 1895, p. 12.)

I might continue at great length to quote from various writers concerning the difficulties of recognizing during life chronic cerebral abscess, and I might add mistake after mistake in diagnosis, not a few of which would be my own, but I have no need to extend my remarks in this direction, as you are aware, I have no doubt, from personal experience, of the uncertainties attendant upon the diagnosis of intra-cranial suppuration, especially of the chronic variety. I do not wish to underestimate the difficulties that are sometimes encountered in diagnosticating acute cerebral suppuration. These not infrequently prove insurmountable, but they are, on the whole, less than are met with in the diagnosis of the chronic abscess. Many of our text-books are content with a description of abscess of the brain as though it always originated in acute cerebral suppuration.

The importance of recognizing the essential difference between acute abscess and chronic abscess of the brain, will justify a rather lengthy quotation from Professor Murri's admirable Address on Experimental Craniotomy and Diagnosis of Cerebral Abscess. (Lancet, January 12, 1895, p. 79.)

"Abscess of the brain, which when clinically considered seems to be an essentially unique morbid process, resolves itself into two varieties which differ utterly in diagnosis—viz acute abscess and chronic abscess. Writers aiming at the unity of the process, lose sight of the clinical side and do not bring into sufficient relief the practical difference which exist between the two varieties. What they say of abscess applies chiefly to the acute form. Bacterial analysis might throw more light on the causes of the differences which are developed in the process of suppurative inflammatiou of the brain. At present what we chiefly know is the intensity of the exciting causes; the duration of the process depends much on these. If a considerable cerebral artery is closed by an embolus; if a wound on the head causes disturbance, contusion or hemorrhage

in a zone of the brain; if a suppurative otitis media violently effects the bony substance and gives rise to a thrombus in the cranial sinuses, or excites inflammation in the adjacent meninges, the nutritive process of the cerebral tissues near can not avoid deterioration, the pyogenic agents find a field well prepared, and their devastations are in consequence very rapid. But here, besides the rapidity of the disease, there arises another clinical distinction. These occurrences, being more intense, can not easily happen without being perceived by both the patient and his medical attendant. Moreover, the succession of phenomena aroused by them is not so disconnected as to lose the evidence of their reciprocal relation and the unity of the process they reveal. Finally, even the reaction of the brain provoked by rapid and great intra-cranial changes is more evident and appreciable to the practitioner. If to all this we add that the rapid diffusion of suppuration causes fever, and even a special fever, as a phenomenon revealing the nature of the morbid process, then it is easy to comprehend how the clinical idea assumes a form so distinct that the diagnosis of acute abscess naturally follows.

When we come to the chronic forms of cerebral abscess, the description and opinions of pathologists, inspired by the observation of such facts, no longer correspond to the facts themselves. In these the exciting causes are less intense or less apparent. It is one thing, for example, if an embolus from a pulmonary vein closes the artery of Sylvius, and another if pus penetrating unperceived into the brain by one of those narrow ways which lead there from without. The slightness of the latter is not only marked by the absence of disorders perceptible to the patient, but it also causes a slower succession of changes around itself; the surrounding tissues, not previously affected and violently attacked, have time to organize themselves for the defence, and in time circumscribe with a solid barrier (pseudo-membrane) the hostile element (pus) which tends to destroy it. This mysterious faculty which the brain possesses of adapting itself to the most serious lesions as long as they are gradual, has full opportunity to act completely. Thus it follows that from ignoring or forgetting the primary cause, it

seems as though no external cause exists; and here we have the idiopathic abscess, which is almost always chronic. Even where the primary cause is known, if it be not violent, the process which succeeds follows with less rapidity, and hence the slight changes of the brain may not arouse perceptible functional disorders. Here we have the latent abscess or the latent period of the chronic abscess. The slowness with which brain alterations proceed proves that a length of time is required for their development, and here we see the abscess become chronic. The perception of these internal processes is often defective, as is frequently seen in the doctrinal works of the pathologists and in the reasoning of clinical physicians, who write and think of cerebral abscess as though it existed only in the acute form. But the abscess exists also in the chronic, idiopathic, latent, or semi-latent form, and this, though less frequent than the acute, is by no means as rare as statistics would make us believe."

A small number of cases of chronic cerebral abscess from their inception to the beginning of the terminal period, and a few others in their most latent stage, may not present pronounced symptoms of organic brain disease until there are manifestations of the terminal period, but a careful study of cases of obscure brain diseases will reduce this number to a minimum. The symptoms of abscess of the brain are common to several forms of organic brain disease, and a correct interpretation of them will depend upon the experience, diagnostic skill and thoroughness of the medical attendant. Professor Murri's precaution to bear in mind the possibility of the presence of chronic cerebral abscess in investigating cases of obscure brain disease might be advantageously observed by all. The frequency of this form of cerebral abscess is not great, but the presence of chronic cerebral suppuration is too often overlooked for the credit of medical science or the welfare of the unfortunate sufferer.

Conclusions reached by an analysis of the most accurate history may, in some cases, lead from the truth; but in the vast majority of instances information thus obtained, together with a thorough examination of the mental and physical condition of

the patient, when all the modifying circumstances of the case are carefully considered, will greatly aid in arriving at an accurate diagnosis. Not infrequently the history of some condition that is known to be favorable to abscess formation in the brain will be obtained from the patient. Months, and, in rare cases, years, may have elapsed since the cause was apparently active, and at the time of the examination it may have been forgotten both by the patient and his friends, and memory of it is only revived by a careful and intelligent line of questioning. It may have been a blow on the head; a fall from a height and lighting on the feet or buttocks without striking the head; a painful condition of one or both ears, either with or without otorrhœa; suppuration in some portion of the body; or some exhausting disease, possibly influenza, diphtheria, rheumatism or typhoid fever, from which recovery has never been complete. In typical cases the history will develop the fact that headache, intermittent or constant, has been a prominent feature for a greater or less part of the time that has occurred since the time of the illness that left the patient's health impaired. In some cases irregular febrile phenomena, dimness of vision, vertigo, failing nutrition and strength, and sometimes mono-spasm, mono-paresis, hemiplegia or general convulsions, have been experienced. In the majority of instances, on examination of persons suffering from chronic cerebral abscess, we shall find evidence of organic brain disease, but occasionally the patient may present a vigorous appearance, and death may occur without warning, as was the case in Professor Murri's experience (*Lancet*, January 12, 1895, page 80). The most careful and exhaustive examination of the motor apparatus and of the general sensory phenomena may yield negative results. The reflexes may be normal or slightly exaggerated. If the motor cortical areas or the motor-tracts of the brain are affected, either directly or indirectly by the abscess, symptoms of paresis, paralysis or muscular rigidity will be present, corresponding to the extent and situation of the abscess and the softening resulting from its presence. Nutrition and muscular strength usually fail in the course of the disease, but in some cases these are unimpaired. Mental failure, especially slow action of the mental

faculties, and difficulty in maintaining mental concentration for a length of time, and lessened power of memory, together with irritability of temper, are not infrequent results of chronic cerebral abscess. Recurring convulsions, sometimes mistaken for those of idiopathic epilepsy, are occasionally found in cases whose other symptoms of cerebral disease are most obscure.

Individual Symptoms.—Among the special symptoms of chronic abscess of the brain, headache is the most important. Its significance is that its beginning dates from exposure to certain conditions that are known to be capable of giving rise to abscess of the brain. It is rarely constant, but there are very few cases of this disease in which headache has not been more or less pronounced during some portion of its course. At times the headache is severe, and at others it amounts simply to a dull or uncomfortable cephalic sensation. In some instances the headache, if present at all, has been so slight as to escape attention entirely. When the terminal period, caused by softening, œdema or extension of the abscess, is reached, headache, even if absent before, often becomes a very prominent symptom, and its severity marks the beginning of the end. The seat of the pain does not always correspond to that of the abscess. If the terminal period is short and the symptoms tumultuous, the obscured consciousness often prevents any voluntary complaint of head-pain being made, although, even in such rapid cases, if the patient can be aroused and his attention engaged for a few moments, the fact that headache exists can, not infrequently, be obtained from the patient in answer to a direct question. The typical temperature of chronic abscess of the brain, if the morbid process is sufficiently large to exert much depression, is normal or slightly sub-normal. At times there may be slight intermittent febrile processes, which are frequently attended by cool and clammy perspiration. Optic neuritis, when present, is a symptom of great importance. Some observers seem inclined to think that it is of infrequent occurrence, while others have observed it in a sufficiently large proportion of cases to regard it as a valuable aid in the diagnosis. In the cases that I have observed it has been more frequently present than absent, but the extreme degree of swelling so com-

monly seen in association with tumor of the brain, I have not observed as a symptom of abscess.

Terminal Period.—This period may extend over several weeks or a few days, and, possibly, in some cases, may last only a few hours. Its duration depends upon the manner in which the abscess causes death. The latent period may end suddenly by the abscess bursting into the lateral ventricles and giving rise to all the symptoms of intra-ventricular hemorrhage. The rupture may occur on the surface of the brain and cause local, or, more commonly, general lepto-meningitis which proves rapidly fatal. When the pus finds its way to the surface of the brain in the posterior fossa, both by the meningitis and the direct irritation of the pons and medulla, the cardiac and respiratory centres are interfered with. In the latter case, if the patient survives the shock, the symptoms will be those of cerebro-spinal meningitis, prominent among which will be retraction of the head, rigidity of the muscles of the back of the neck, and sometimes of the spine, with manifest opisthotonus and shock-like, convulsive rigidity of the muscles of the limbs, especially of the arms. Œdema and softening of the brain substance are the causes of death in about one-half of the cases of abscess of the brain. In many of these in which the motor and sensory areas of the brain are not especially affected, either directly or indirectly by the abscess, the softening may take place so gradually that no symptoms of it may be detected until sudden collapse or death results from the apparent arrest of cerebral function. It is probable, however, that if these cases that end suddenly from softening and œdema were carefully watched, symptoms of failing brain power and general vigor, together with increased head-ache, irritability of temper and a tendency to depression, might be detected weeks before the fatal end. In all the cases of chronic abscess of the brain, except one, which have come under my observation during the terminal period, the symptoms of this stage have developed in a sub-acute manner. The prominent symptoms have been headache, usually dull and heavy in character, but at times attended with severe paroxysms of pain, failure of nutrition, energy and strength; mental dulness and slowness, and irrita-

bility of temper; vomiting only when associated with severe paroxysms of pain in the head; optic neuritis in a number of instances; slow or normal pulse when the patient is quiet, but sometimes easily accelerated by exercise; sub-normal temperature in nearly every case; convulsions occasionally at the beginning or ending of the terminal period; paralysis, usually hemiplegic in character, or paresis with rigidity of the affected muscles from pressure on the motor fibres of the brain, in more than one-half the cases; and in a number, hemi-anæsthesia with hemi-anopsia. As the terminal period progresses, the symptoms increase in gravity; the sensory functions become more and more blunted, the patient's apathetic condition increases, and finally stupor, followed by coma sets in, and the patient dies after remaining unconscious several hours to several days. It is rare after symptoms of the terminal stage become prominent, for the patient to show more than temporary improvement.

Localizing Symptoms.—Percussion has afforded me little or no aid in diagnosticating a chronic abscess. The localizing symptoms of abscess of the brain may vary from those of tumor because pressure symptoms are sometimes less marked in the former than in the latter, and on account of the more complete destruction of tissue and greater œdema and softening found associated with abscess. We must remember, however, that a tumor may exert no more pressure than abscess and that it may as effectively destroy brain substance as the latter. Definite local symptoms are less frequent from abscess than from a morbid growth, because the most common seats of the former are in those portions of the brain, the cerebellum, frontal and temporo-sphenoidal lobes, whose function is not definitely known. It is probable that distinct localizing symptoms are as frequently absent as present from abscess of the brain.

Frontal Lobe.—A large abscess may exist unsuspected in the anterior portion of the frontal lobe, and a small one may be situated just anterior to the motor region without giving rise to symptoms indicative of its location. It is only when softening or œdema extends backward to the motor area of the cortex or the white substance beneath it, or pressure is exerted on this portion of the brain that localizing symptoms develop, except

in a few cases in which pupillary symptoms are found when the abscess is in the posterior and lower portion of the frontal lobe. If, with general symptoms of abscess of the brain following a blow on the front of the head, a septic embolus from the lungs or associated with an infective process in the frontal sinus, a gradual increasing paresis or paralysis of the face or arm on one side should occur, preceded, or not, by convulsive movements of the affected muscles, pupillary symptoms would indicate one frontal lobe as the seat of the abscess. If the pupil on the side opposite to the one on which the muscles are involved should become sluggish or inactive, while its fellow responded normally to light and accommodation, it would aid in locating the abscess in the posterior portion of the frontal lobe. It must be borne in mind that the same pupillary phenomena may be present when the anterior portion of the temporo-sphenoidal lobe is the seat of the abscess as occurs from a similar lesion in the posterior portion of the frontal, but suppuration in the former situation usually results from middle ear disease. Macewen's observations in relation to the pupillary phenomena may be quoted in full. "When the abscess is situated in the temporo-sphenoidal or frontal lobe, the pupil on the same side as the abscess may either become myotic or mydriatic, accompanied by a degree of stability. When the abscess is small and produces cerebral irritation, the pupil on the affected side may be more or less contracted and sluggish. When the abscess is large and exercises considerable pressure, the pupil on the affected side is prone to stabile mydriasis. An abscess which is small and produces a stabile myosis to begin with, may, as it augments in bulk, produce a stabile mydriasis in the same eye. Occasionally, the only difference detectable is sluggishness of one pupil to both light and accommodation while its neighbor acts freely. In a case of cerebral abscess, a sluggish pupil with either mydriasis or myosis on the same side as an infective injury to the skull, or a unilateral otitis media, affords further evidence of the abscess being on the corresponding side of the brain." ("Pyogenic Infective Diseases of the Brain and Spinal Cord," p. 145). In five cases of abscess of the frontal lobe observed by me, the pupillary phenomena de-

scribed by Macewen were present in only one, but this was the only one of the five in which the abscess was located in the posterior portion of this lobe.

Temporo-Sphenoidal Lobe.—A small abscess, and even one of considerable size, may be situated in the temporo-sphenoidal lobe without giving rise to any distinct localizing symptoms. In the case of chronic abscess of this lobe, the history, most likely otitis media on the same side as the abscess, might afford the only clue to localization. A large abscess, on the other hand, would probably develop localizing symptoms from the effects of pressure on the surrounding structures, and if extensive softening and œdema should occur, regions of the brain whose functions are fairly well known would become involved. If the abscess were on the left side in the posterior portion of the temporal region, so as to affect the first and second temporo-sphenoidal convolutions, sensory aphasia would be present. On either side of the brain, a large abscess in the anterior portion of this lobe might cause paresis or paralysis, first in the face, and secondly in the arm of the opposite side, with pupillary symptoms, such as sometimes occur in abscesses situated in the posterior portion of the frontal lobe. Macewen has observed in cases of abscess in the anterior portion of the temporo-sphenoidal lobe, paralysis of the third cranial nerve of the same side, thus producing crossed paralysis - the third cranial nerve on the same side as the abscess and paralysis of the face and arm of the opposite side. A careful study of the direction in which the paralysis extends after the first group of muscles is involved will often afford valuable information upon which to base a localizing diagnosis. Not infrequently the middle-ear disease which leads to acute abscess of the brain, paralyzes the facial nerve as it passes through the Fallopian canal, but this rarely occurs in chronic abscess.

Occipital Lobe.—In three cases of chronic abscess of the occipital lobe observed by me, paresis and muscular rigidity, nearly complete hemi-anæsthesia, and hemi-anopsia of the opposite side existed. In each case the abscess was large and situated in the white substance, so as to exert pressure on the fibres of the posterior half of the internal capsule. It is probable that the fibres

coming from the cortical center of sight in the cuneus were rendered functionless either by pressure or softening, as the cortical substance of this region did not seem to be directly involved. A small encapsulated abscess, in all probability, might remain in the white substance of the occipital lobe for a long time without giving rise to any localizing symptoms.

Cerebellum.—An encapsulated abscess of considerable size situated in the posterior portion of one lateral lobe of the cerebellum might cause no definite symptoms so long as it remained more or less latent. An abscess in the anterior portion of either lateral lobe, or one in the middle lobe would likely give rise to pressure symptoms on the pons and medulla, in which case cerebellar ataxia would be manifest. The cardiac and respiratory phenomena, together with yawning, observed in acute abscess of the cerebellum, would probably not occur in the chronic abscess until the terminal stage develops.

Differential Diagnosis.—Other organic lesions than abscess of the brain are attended by symptoms common to intra-cranial suppuration, so that one of the most difficult problems encountered by the clinical physician in the diagnosis of chronic cerebral abscess is differentiating it from other diseases that so nearly resemble it, both in their clinical history and apparent etiology.

The following case illustrates the similarity of the symptoms of cerebral softening following thrombotic occlusion of an artery to those of cerebral abscess. A man 22 years of age, an Austrian by birth, a miner by occupation, living in Colorado four years, was admitted into the Arapahoe County Hospital March 25, 1895, completely paralyzed in the left leg and arm and lower side of the face of the same side, the upper portion of the latter being paretic. His family history was negative, and he had always enjoyed good health up to the beginning of his present illness. He denied indulgence in alcohol further than an occasional glass of beer, and said that he had never exposed himself to venereal poison. About two months before coming under my care he suffered for two or three weeks from pain in the left side of the head and the left ear. Bleeding, by the application of leeches over the left mastoid process.

seemed to relieve the pain, both in head and ear. About four weeks before coming under my observation he felt weak in the left arm for a day or two. The arm seemed all right on the third day, but on the fourth it became quite weak, and he began to suffer from pain in the left side of the head in the parietal region, and occasionally in the anterior temporal. Two days later the left leg was weak and awkward, and the day following, the left side of the face was observed to be smooth and the mouth drawn to the right. Seventeen days before I saw him, when he first came to Denver from Idaho Springs, he could ascend and descend stairs, but the whole of the left side was weak, yet he could still use the left arm some, although not as well as the left leg. Two days later, or on the 10th of March, the left arm and leg and the lower portion of the left side of the face became completely paralyzed, and remained in this condition until he entered the hospital on the twenty-fifth day of March. Consciousness had never been affected.

Examination on Admission.—There was complete flaccid paralysis of the left arm, left leg at ankle and knee, and lower half of the left side of the face. The upper portion of the face and the hip were paretic. He could not close the left eye as tightly as he could the right. The tongue was protruded slightly to the left, and when the face was at rest the mouth was drawn a little to the right. The left side of the face seemed equally weak both for voluntary and emotional movements of the affected muscles. The deep reflexes were slightly increased on the left side, but the superficial were absent. It was impossible to make a satisfactory examination of the sensory phenomena in the absence of an interpreter. The fundi and discs of the eyes were normal. Both pupils were dilated, the left being larger than the right, and both acted feebly to light and accommodation. The axillary temperature was 98.6° Fahr.; pulse, 72; respiration, 20. His mind seemed clear, and he appeared to appreciate what occurred around him. Three days later, or on the 28th, I began having the temperature registered in each axilla thrice daily, at 6 A. M., 12 M., and at 6 P. M.; and this was continued until April 12, the time of the operation. At noon of the 28th the temperature was: R., 99.8° Fahr.; L.,

99.6° Fahr. It remained about the same until the next day at noon, when it was found one degree below normal, and the same in each axilla. On the 30th the temperature was found to be 100° Fahr. in each axilla, and the next two days it was normal. The pulse varied from 70 to 72, and respiration from 18 to 24.

On April 1, 1895, assisted by an interpreter, I made a more careful examination. At that time he could raise his left leg from the bed and hold it straight at the knee. but there was absolute paralysis of the muscles below the knee. The arm and face remained about the same as on the former examination. The left trunk muscles were weaker than the right, but still retained considerable power. Dyn. R., 120; L. O knee jerks: R, absent; L., increased. Ankle clonus: R., absent; L., present and continuous. Tendo Achillis: R., absent; L., increased and attended by clonus. Plantar reflexes: R., present; L., absent. Cremaster and abdominal reflexes: R., present; L., absent. The deep reflexes of the right forearm were slightly increased; the left were exaggerated. All the sensory phenomena were lessened on the left side, the temperature sense being the most impaired; on the right, sensation was normal. Taste and smell present on each side and about equal. Hearing with watch: R., $\frac{10}{12}$; L., $\frac{8}{12}$; with tuning-fork hearing was better in left ear. Eyes: R., V = $\frac{20}{30}$?; fields, temporal normal; nasal absent up to median line; and fundus and disc presented nothing abnormal; L., V = $\frac{20}{30}$?; fields, nasal preserved; temporal absent up to median line. Some obscuring of the nasal side of the disc by congestion and recent exudate. Beginning neuro-retinitis was apparent. The next three or four days the axillary temperature was about normal or slightly sub-normal. On one occasion it was nearly .2° below normal. On April 4, the left remained about the same as on the 4th, and the right fundus and disc were still normal. Power seemed to be returning in the left leg, but no change could be detected in the arm and face. Bi-lateral left homonymous hemi-anopsia was still absolute. Sensory function was greatly lessened throughout the left side, but it was most impaired in the arm. During the entire time he had been in the hospital he had complained of considerable pain in the right side of the head,

extending from the anterior temporal region back to the posterior parietal. The head temperature had been persistently slightly elevated, and the rise was sufficient to lead me to diagnosticate an irritative lesion in the brain. From the 4th to the 12th of April the patient remained in nearly the same condition that he had been in from March 25 to April 4, except that headache became more troublesome and was limited to the right parietal region. The axillary temperature remained practically normal; was about equal in each axilla, but occasionally it was .1° to .2° higher in the left than in the right. As time wore on the tendency was for the temperature to be slightly continuously higher on the paralyzed side, but the difference was never more than a few tenths of a degree.

On April 10th, he made a slight correction in the history of his illness. In the original history he had stated, or the interpreter had made him state, that he had pain in the left ear, and this, together with the head-pain, had been relieved by leeches applied over the mastoid region, but in his revision he said it was four months ago when he had pain in the left parietal and frontal regions of the head, and there was no pain in the ear. He re-affirmed the former statement that the pain in the left side of the head ceased on the application of leeches to the mastoid region. About this time it was observed that anæsthesia of the left side, including the face and scalp, was becoming more pronounced. Repeated registration of the surface temperature of the head showed the head temperature to be about 2 degrees above normal. This indicated an irritative lesion of the brain. The urine had been examined a number of times and found free from albumen and sugar, and no cardiac murmur had been detected. The young man's age was against the idea of hemorrhage; there was no cause so far as I could detect, for embolism, and his repeated and positive assertion that he had never exposed himself so as to contract syphilis, made me inclined to disregard the vascular lesions, although in a clinical lecture on this case delivered the day before the patient was subjected to an operation, I stated that thrombotic occlusion of arteries, of syphilitic origin, would best explain the symptom group. The localizing symptoms indicated two sep-

arate and distinct lesions, one in the Rolandic region on the right side involving primarily the arm centre, and the other in the centrum ovale of the temporo-occipital region of the same side. I argued that a single lesion in the centrum ovale so situated as to cause anæsthesia of the opposite side, would affect the leg as much or more than the arm, and the face would be involved to a less extent than the leg or arm. But in this case, the face and arm being more affected than the leg, indicated that we should find two lesions. Excluding a vascular lesion, the probabilities were in favor of a tumor or an abscess. Multiple tumors in the centrum ovale are uncommon and the absence of choked discs was decidedly against the diagnosis of tumor. In favor of abscess we had the gradual onset of the paralysis involving one group of muscles after another, and the seat of one of the lesions in the centrum ovale of the occipital lobe was the common location of abscess of pyæmic origin. No distinct cause could be found for abscess, but I consented to recommend an operation for the relief of the patient in hopes that we should be fortunate enough to find and evacuate one or more abscesses.

On the 12th of April Dr. Edmund J. A. Rogers removed a button of bone from the skull over the arm centre on the right side and found the brain substance, including the cortex immediately beneath the trephine opening, soft and diffluent, looking very much like pus. On exploring the centrum ovale in the occipital region, another area of softening was found. Dr. Leonard Freeman, pathologist to the hospital, examined the material as it was taken from the brain, and his report is as follows:

"The soft, white material removed from the brain by Dr. Rogers, closely resembled pus to the naked eye, but under the microscope no pus corpuscles could be seen. A few red corpuscles were detected, but they probably came from the blood that mixed with the material during the operation. The corpuscles of Gluge were quite numerous, and some small, fat globules were observed here and there. The mass of the substance was composed of disintegrated nerve fibres, which were rather short, and could be distinctly seen and accurately

studied as they floated in the current of the fluid across the field. There were no gliomatous or other tumor cells, and no crystals of any kind. There was no reticulated structure."

The operation was carried no further than to remove the most diffluent of the broken down brain substance. The wound was carefully dressed and the patient regained consciousness and said his head felt better. About twelve hours after the operation he began to exhibit evidences of failing and the temperature rose to 100° Fahr. After this he lost rapidly and died fifty hours after the operation, the temperature reaching 106° Fahr. just before death.

Autopsy, six hours after death, performed by Dr. Leonard Freeman: On removing the iodoform gauze from the wound, softened brain substance, and yellowish, whitish particles resembling disintegrated brain substance ran out. The middle meningeal vessels on either side arose from the ophthalmic vessels. Great œdema existed at the base of the brain, especially around the cerebellum, pons and medulla. The arteries at the base of the brain presented no evidence of disease, except on the right side, where the middle cerebral was thickened and its calibre was occluded by a thrombus at the point where the nutrient vessels to the basal ganglia were given off. The cortex of the middle and lower Rolandic region and temporosphenoidal lobe was softened The cortex of the left hemisphere was negative. On cutting into the right cerebral hemisphere, a large area of softening, about three inches by two in size, occupied the cortex of the middle and lower Rolandic region and the white substance beneath. The occipital lobe was the seat of a large area of softening which occupied nearly the entire white substance of this lobe. The softening in the occipital lobe reached the cortex postero-laterally. The entire corpus striatum and thalamus were softened but not diffluent. Interior of the left hemisphere presented no pathological appearances. Cerebellum and ventricles negative. The microscope showed the change in the arterial walls to be syphilitic.

In the light of the autopsy the clinical history is clear, and had not syphilis been so strenuously denied, no other diagno-

sis than that of arterial occlusion would have been seriously considered. It is useless to speculate whether the man knew he had syphilis; whether he had contracted it without sexual intercourse and did not know it, or whether the condition of his cerebral blood-vessels was due to hereditary syphilis. The latter is very improbable.

The following case coming on after an attack of influenza, possible cause of cerebral abscess, and presenting symptoms of meningitis, was due to an unsuspected vascular lesion which proved fatal.

J. N., aged 30, white, a boiler-maker by occupation, whose family and personal history were not obtainable, suffered from la grippe about four weeks before. He was greatly reduced by the attack, but no localized lesion was found. He had gradually recovered so that he anticipated returning to work in a day or two, but he was still weak and languid. On the morning of the 17th, about thirty-six hours before I saw him, he awoke and was talking with his wife, when suddenly he put his hand to his head and cried: "O, my head!" Soon after this he lost consciousness, but he rallied in the course of a few hours and talked some during the day, but seemed dull and stupid and complained of pain in his head. The next morning he was nearly unconscious, but in the afternoon he was able to talk with his wife and seemed rather bright. The temperature, Dr. Richmond reported, had appeared normal, although he had not registered it. When I entered the room at 5 P. M., he observed and spoke to me, and said that his head was paining him. He looked depressed and appeared to be suffering. Pupils were small, but responded to light. The posterior cervical muscles were rigid and the head slightly retracted. After I had been in the room examining him for two or three minutes he became unconscious, and I found it impossible to arouse him. The temperature was 98.3° Fahr. in each axilla; pulse, 72; respiration, 16. The knee-jerks were slightly increased. The ophthalmoscope showed no ocular change, and there was no evidence of paresis or paralysis of any muscles. The history of la grippe, the prolonged convalescence following it and the sudden development of head-pains with normal temperature made me appre-

hensive of cerebral abscess, although no discharge was observed from either ear, and his wife stated that he had had no ear trouble. On removing him to the County Hospital two hours later, his temperature was found to be 100.4° Fahr. in the right axilla, 100.2° Fahr. in the left, and 100.4° Fahr. in the rectum. The rise in temperature was thought to be due to the disturbance caused by removing him to the hospital. He did not seem to be totally unconscious; his eyes would follow me or the lamp around the room; when asked his name he endeavored to give it, and succeeded in doing so in an indistinct manner. I asked Dr. Rogers, the attending surgeon at the hospital, to see him with me at 9 P. M. The temperature then registered 99° Fahr. in the right axilla, and 99.2° Fahr. in the left; pulse, 60; respiration, 16. Retraction of the head was well marked, and on my attempting to bring the head forward, it seemed to give him some pain. The diagnosis at this time seemed to rest between meningitis and cerebral abscess. The retracted condition of the head indicated irritation of the meninges in the posterior cerebral fossa, but the normal temperature at the time of my first visit, and its again descending after he had been resting a few hours in the hospital, seemed to militate against the presence of meningitis. That night his temperature was registered in each axilla every two hours, and the average temperature for the night was 98.4° Fahr., being about the same in each axilla. At 9 o'clock the next morning the temperature in each axilla was 99° Fahr.; pulse, 64; respiration, 18. He was becoming more stupid, pulse was occasionally irregular and respiration at times intermittent. At noon, when Dr. Rogers again saw him with me, his condition remained about the same as it had been during the morning, but we could find no indications for operative procedure. During the afternoon his temperature varied from 98.6° Fahr. to 99.4° Fahr.; pulse, 63; respiration, 18. It was quite evident that there was pressure in the posterior fossa, especially around the pons and medulla. The low temperature contra-indicated meningitis, although normal or subnormal temperature is sometimes observed in this disease. Abscess of the brain did not seem likely, as the temperature had been found constantly a little above normal most of the time for the twenty-

four hours he had remained in the hospital. During the afternoon he seemed to be sinking into a deep comatose condition, and it was evident that life could not be prolonged many hours unless relief of pressure on the pons and medulla was effected by surgical means. I could be positive of but one thing, and that was pressure at the base of the brain in the posterior fossa. A button of bone was removed from the posterior ceerbral fossa of this patient, and the parts irrigated for the relief of cerebral pressure, the patient subsequently dying.

Autopsy eleven hours after death by Dr. Leonard Freeman, pathologist to the hospital:—The wound had healed without the formation of any pus, and no abnormal adhesions between the dura and the bone were detected. The external surface of the dura presented a healthy and glistening appearance. The pia over the convex surface exhibited no marked changes except engorgement of the veins. No clots were found in the venous sinuses. The arteries at the base of the brain presented evidences of disease in their walls, and in the main branch of the left middle cerebral artery, just before the cortical vessels are given off, a clot was found, which blocked up the entire calibre of the vessel. In the centrum ovale of the left frontal lobe, a considerable quantity of semi-fluid blood was found, which, after ploughing up and destroying a considerable portion of this part of the brain, ruptured into the lateral ventricle, and filled the lateral, third and fourth ventricles. The corpora striati were softened. A slight hemorrhagic extravasation was found in the right frontal lobe. The remainder of the brain presented a normal appearance. There was no evidence of any meningitis, nor of abscess. The pathological condition was one of hemorrhage into both frontal lobes, the greater in the left, the blood finding its way into the lateral ventricles, and filling these, together with the third and fourth ventricles.

The case just reported presented symptoms before death that were difficult to interpret. At the time of my first visit, the normal temperature, dazed appearance, and retraction of the head, following a prolonged convalescence from an attack of la grippe, suggested the possibility of cerebral abscess complicated with cerebro-spinal meningitis. It may be thought that the

sudden onset of the cerebral symptoms should have suggested cerebral hemorrhage, but we know how common it is for a cerebral abscess to be unsuspected until it ruptures into the ventricles, when the symptoms simulate those of hemorrhage into the cavities of the brain. A large hemorrhage into the ventricles is so commonly attended with a subnormal temperature at first, and a few hours later by a considerable rise of the temperature, that the case did not appear like one of cerebral hemorrhage. Further, the man's age was against the probability of hemorrhage. The subsequent history of the case after the patient was admitted into the nervous wards of the hospital soon made me give up all thoughts of a cerebral abscess, and led me to regard it as a case of cerebro-spinal meningitis. The sudden loss of consciousness, followed an hour or two later by a return to a conscious condition, and, after this, consciousness and unconsciousness alternating one or more times, were difficult to explain before death.

The normal temperature at the time of my first visit may probably be explained by the irritating influence of the blood in the lateral ventricles counteracting the depressing effect of the hemorrhage into the anterior lobes of the brain. The condition of alternating consciousness, in the light of the post-mortem results, is probably explicable from the fact that hemorrhage first took place in the substance of the left anterior lobe, which probably gave rise to loss of consciousness. After reaction from this, consciousness probably returned, and subsequently, when the blood burst into the lateral ventricles, consciousness was again lost. As this process of filling the ventricles was evidently a gradual one from the fact that depression was no greater, consciousness returned while this was going on, and it was not till the lateral ventricles became completely distended and the blood had found its way into the fourth ventricle that consciousness was finally lost.

Hemorrhage into the frontal lobes of the brain is of extremely rare occurrence, and hemorrhage in a man so young as the patient whose case has just been reported, is extremely infrequent. A hemorrhage into the centrum ovale of the temporo-sphenoidal lobe, and then bursting into the lateral ventricles,

would have found its way so readily into the cavities of the brain as to overwhelm the vital forces of the patient, and cause a profound shock, such as is commonly witnessed in ordinary intra-ventricular hemorrhage. The retraction of the head was due to blood in the fourth ventricle, and the serum of the blood which had found its way around the pons and medulla into the posterior fossa, came from the blood in the fourth ventricle.

The case throughout its clinical history was a most puzzling one, and a positive diagnosis was not attempted. It was quite evident that there was irritation in the posterior fossa, and that in this portion of the brain intra-cranial pressure was increased; but beyond this I would not be positive, though the most likely thing that would account for it seemed to me at the time to be a basilar meningitis, with exudation around the pons and medulla.

We meet with cases whose symptoms are apparently best explained by a vascular lesion, but at the autopsy an unsuspected cerebral abscess may be found, as occurred in a man whose history is as follows: John S., 75 years of age, white, widower for a number of years, born in Ireland, by occupation a laborer, of large physique, in Colorado since 1870, was admitted to the Arapahoe County Hospital, January 22, 1895. Family history, so far as I was able to learn, was unimportant. His health in childhood was good, and he had no serious illness until his 70th year. He had indulged rather freely in alcohol, but during the last five years he had rarely drunk. He denied syphilis, but suffered from gonorrhœa twenty years before. He received a bullet-wound in the left shoulder while in the army, in 1861. With the exception of the time during which he was disabled on account of the wound, he said that he was never sick a day in his life until twelve years ago, when he was kicked on the left shin. The injury to the left leg was followed by great pain, and later a large ulcer developed, which nearly healed at times, but for a number of years he had a large open sore on this leg. One month before coming to the hospital, however, the ulcer completely healed, leaving a large dark-colored, rough cicatrix, which was very tender to pressure. For some years he had suffered from vague rheumatoid pains in the legs, especially

in the knees and ankles, and in the entire left leg he had had a feeling of numbness for about five years. This leg seemed to him awkward, but he was able to walk with the use of a cane. For a number of months there had been a partial inability to control the bladder; frequently he would soil the bedding and his clothes, and had to evacuate the bladder several times during the night. The patient said he was struck over the lower portion of the back and nates by a cable-car early in January of the present year. He was able to rise and walk immediately after, and he did not think he had sustained much injury, although pressure over the lower portion of the back gave him considerable pain. Since the accident he had lost all control over the bladder, and the left leg had been very weak. The left arm, he had noticed, was weaker than the right. He had been obstinately constipated for a number of months. The condition of the right pupil, which was widely dilated and immobile, was the result of an injury which he received eleven years before to this eye.

Examination January 22, 1895: "He is unable to stand on account of the weakness of left leg, and the examination has to be made while patient is lying in bed. An old scar is observed on the anterior surface of both legs, below the knees. They are evidently the result of old ulcerations. The arteries of the extremities are hard and unyielding. The left leg is very weak, but he can move this leg at all the joints, although the power is feeble and the movements are ataxic. The ankle muscles of the left leg are weaker than those of the knee, and the latter are weaker than those of the hip. Muscular power seems to be fairly good in the right leg; the left arm is weaker than the right; Dyn. R., 100; L., 40. There is slight rigidity in the left arm with a tendency to hold the arm close to the side of the chest, and flexed at right angles at the elbow. His mental condition seems feeble, concentration of his mind is very difficult, and it is almost impossible to keep his attention on one subject more than a few minutes at a time. There is considerable loss of sensation throughout the left side, apparently more pronounced in the arm and leg than in the face. The knee-jerks are present, the left slightly increased, while the right is less

than normal. Plantar reflexes and tendo Achillis are present; ankle clonus absent; cremaster and abdominal reflexes are absent. The external ocular muscles seem to act normally. The right eye is cataractus, the pupil being widely dilated, and does not respond to light or accommodation. The left pupil is very small and does not respond to active mydriatic, so that an examination of the fundus of either eye is impossible. There is apparent hemi-anopsia affecting the temporal side of the left eye; the fields could not be tested in the right eye on account of the presence of a cataract. The mental hebetude was too great to permit of an accurate examination of the special senses. The temperature is 98.2° Fahr.; pulse 60; respiration 24." During the first week of his stay in the hospital, his temperature varied from 98° Fahr. to 99.2° Fahr., usually being about 98.4° Fahr. in the morning and 98.8° to 99° Fahr. in the evening; the pulse ranged from 54 to 90, only falling to 54 on one occasion, to 60 on three, and to 66 on two, the usual variation being from 72 to 88; respiration varied less than the pulse, ranging, except on two evenings, from 18 to 20. A record of the temperature, pulse and respiration was made twice daily. During this week he gradually failed, both mentally and physically. He soon lost all continuity of thought and his mind was a complete blank for any event of a recent occurrence. He ate but little, he emaciated rapidly, and passed the discharges from the bladder and bowels into the bed. The second week, from January 29 to February 4, there was a gradual failure. The temperature ranged between 98° and 99.4° Fahr.; pulse between 60 and 80; respiration between 18 and 20. During the third week prostration increased rapidly, and his mind became a total blank. The temperature was a little lower than during the preceding week, rising above 98.4° Fahr. only once, when it reached 100° Fahr. one evening, but most frequently it registered 98° Fahr. The pulse varied from 70 to 96, averaging about 80, and was weak and compressible; respiration ranged from 20 to 36. The rigidity of the left arm and leg muscles became more pronounced. On February 12 he passed into a deep comatose condition, and the muscular rigidity began to relax, and at 5 P. M. the temperature

was 99° Fahr.; pulse 100; respiration 24. The next morning at 7 o'clock the temperature had reached 101.4° Fahr.; pulse 120; respiration 40; and at 5 P. M. the temperature was 105° Fahr.; pulse 130; respiration 36. He died during the night.

Autopsy.—The post-mortem examination was made about twenty hours after death by Dr. Leonard Freeman, pathologist to the hospital. The dead room was cold and the body thoroughly frozen. Unfortunately, only the contents of the cranial cavity were examined. The adhesion of the dura to the bone was not abnormal. The membranes and cortical surface of the brain, neither on the convex nor on the basilar surface showed any evidence of disease. The vessels were atheromatous, but not to a pronounced degree for one 75 years old. On sectioning the left cerebral hemisphere, no gross pathological changes were found, but in the right hemisphere, an encapsulated cavity about two inches in diameter, containing a foreign substance, presenting almost the identical appearance of orange water-ice, was found in the centrum ovale of the parieto-occipital region. The greater portion of the pathologic process had taken place in the occipital lobe. The lateral ventricle had not been broken into, but only a very thin partition of brain substance intervened between the cavity and the posterior horn of this ventricle. None of the cortical substance of the brain had been directly involved by the foreign substance, which occupied a position so as to exert pressure on the right internal capsule. No evidence of gross disease was found in any other portion of the brain. In the frozen state it was impossible to determine whether the lesion was a cyst or an old abscess. On melting the icy contents of the cavity, they presented the appearance of a watery, straw-colored liquid, and seemed to be the results of a cyst, but the microscope showed numerous granular and broken down pus cells, proving the lesion to be a chronic abscess. There was no odor. After warming the brain, the right hemisphere was found to be much softer than the left, but the extent of the anti-mortem softening could not be determined, as brain substance softens so rapidly on warming it after it has been frozen.

Although I had had an opportunity to study the above case for a period of three weeks, the presence of an abscess of he brain had not been suspected before death, and finding one at the autopsy was a great surprise to me. The age of the patient, the atheromatous condition of the radial arteries, and the comparatively sudden onset of symptoms of cerebral softening, led me to suspect and to diagnosticate arterial thrombosis. The temperature was normal, or nearly so, as is common to abscess or slow necrotic softening taking place after occlusion of a cerebral artery. I regret that I did not make a careful comparison of the temperature in each axilla. It is probable that the temperature would have been found higher on the paralyzed than on the unaffected side. In hemiplegia from necrotic softening, it is likely that this difference of temperature in the two axillæ does not exist to a marked degree, and, when present, is not persistent, except, possibly, when the lesion causing the softening is an irritative one, as sometimes happens in acute softening from obstruction of large vessels. The history of a fall did not militate against thrombosis, as the head did not appear to have been injured at the time, and it is not infrequent for occlusion of a cerebral artery in the aged to be preceded by increased physical exertion, which may or may not be a determining influence in the final closure of a narrowed vessel. As it was impossible to obtain a view of the ocular fundi, the condition of the discs could not be ascertained. The absence of headache was in favor of a vascular lesion, and against abscess or tumor. In a man 75 years of age, the sudden occurrence of a hemiplegic lesion, without headache preceding or following it in the absence of a growth, or the history of one, in other portions of the body, the presence of tumor of the brain is not suspected. While no age is probably exempt from abscess of the brain, the infrequency with which it occurs in extreme old age, made it improbable that I should meet with it in a man 75 years old. Of 223 cases of abscess of the brain tabulated by Gowers, in his work on the diseases of the nervous system, only one was found at the 70th year or over. There was no discoverable cause for cerebral suppuration. There was no discharge from the ears, or history of any; the nose appeared

to be free from infective material; and no evidence of purulent substance in the thoracic or abdominal cavity was detected during life. In reviewing the history of the case after the autopsy revealed an abscess of the brain, it has occurred to me that the large, open sore on the leg might have furnished infective material with which the brain substance became infected. The ulcer had troubled him for a period of twelve years, but it had entirely healed, he said, a month before he came to the hospital. The appearance of the cicatrix indicated that the sore had been healed several months. As his memory for recent events was greatly impaired on his entering the hospital, it is probable that events that occurred months or years before, appeared to his mind of a later date. This loss of time-sense is common in dementia, especially of the senile variety. We must remember that the left leg had appeared numb, weak and awkward for a period of five years, and for a number of months he had lost partial control of the bladder. The capsule and its contents indicated that several months, at least, had elapsed since cerebral suppuration took place. What part the blow to the lower portion of the spine had had to do with causing the abscess, it was impossible to say. No tenderness of this portion of the spine was detected at the time of my examination. If the blow occurred only two weeks before he entered the hospital, as he stated, it is quite evident that it played no part in the causation of the cerebral suppuration, but, as before stated, his time-sense for recent events was impaired, and no reliance could be placed upon his statements relating to time, especially for things of comparatively recent date. Had the diagnosis of cerebral abscess been made on the patient's admission to the nervous wards of the hospital, I should have recommended and urged a surgical operation, as no hope could be entertained without the evacuation of the abscess, although the extreme age and prostration of the patient would have lessened the probability of recovery.

Not infrequently the history obtained from the patient is sufficiently inaccurate to be misleading. In such cases the corroborative testimony of the friends may aid in arriving at a correct diagnosis. A man about 30 years of age came under my

care a few months ago, and reported that he had been suffering from headache for two or three months. His habits had been dissipated; he had indulged in alcohol and venery to excess, and had contracted syphilis some years before. He gave no history of a fall, a blow on the head, otorrhœa, or injury of any kind. He had been treated for typhoid fever for a number of weeks previously to my seeing him, and had emaciated considerably. On examination I found that the left arm and leg were weak, and that his mind was clouded. There was lessening of all sensory phenomena on the left side, and a complete left bi-lateral homonymous hemianopsia. The Wernicke pupil was absent. A few hours later he became stuporous, and soon passed into a comatose condition, and the left leg and arm became rigid and the flexor muscles contracted. The left side of the face soon appeared paretic, and the tongue was protruded slightly to the left of the median line. He lived about three days, and died in a comatose condition. The first two days his temperature was normal or sub-normal; the pulse and respiration were exceedingly slow. The day of his death the temperature was quite high, reaching 104° to 105° Fahr., and the pulse and respiration were frequent. With this history, it seems to me that the most probable condition was one of syphilitic growth in the brain, especially when taken in connection with the choked disc which was present in each eye, but the swelling was not extreme. Thrombosis of a cerebral artery was excluded on account of the presence of the optic neuritis, and nothing but the sub-normal temperature and the peculiar rigidity suggested an abscess of the brain. The lesion was located in the centrum ovale, involving the occipito-sphenoidal region. After the patient's death, and before the autopsy was held, it was learned through his brother that some time preceding his fatal illness he had had a fall and struck on his head; after this he was dizzy and suffered from headache for a time, and even after returning to work his head felt uncomfortable. With this additional history, an abscess was made probable, and at the autopsy a large encapsulated abscess was found in the centrum ovale on the right side, involving the occipital and temporo-sphenoidal lobes. The whole of the right side of the brain was œdematous.

It is well-known that trauma of the brain may excite into activity latent syphilis of the brain, and the diagnosis between abscess and syphilis of the brain may become a difficult problem to solve in syphilitic subjects who suffer from an injury to the head. In this case, the paresis of the left leg and arm, when I first saw the patient, followed by the rigidity of the muscles, indicated an abscess rather than a tumor as the rigidity indicated extensive softening, which is more common to the former than to the latter.

Some cases of brain lesion may improve under anti-syphilitic treatment for a number of months, and then relapse after the treatment is suspended, and again improve from the same treatment, and yet at the autopsy an abscess and not a tumor will be found. A case of this kind came under my care more than a year ago. The patient was a man, a tailor by occupation, whose habits had been bad. He was a free drinker; had suffered several times from gonorrhoea, and had contracted a hard chancre about ten years before. He had never been the subject of traumatism. About eighteen months before I saw him he suffered from a severe cold which was followed by purulent bronchial expectoration. Soon after this, he began to complain of headache; his general health failed, and he lost flesh and strength, and his mental power was lessened. On consulting a physician, because of his syphilitic history and head pains, he was placed upon potassium iodide for a number of months, and his headache decreased, but did not entirely disappear; he continued rather weak; appetite poor and vacillating; bowels constipated; and he was unequal to his work both mentally and physically. He continued in this condition of impaired health for more than a year when his headache again increased, and mental confusion became greater, and he felt a sense of physical prostration almost continually. He slept poorly, became very much emanciated, and his headache at times was agonizing. He was again treated for syphilis of the brain, and again temporarily, but only slightly improved in health. His condition became miserable, but he did not especially attract the attention of the remainder of the lodgers in the house where he was staying. After passing a restless night, he arose in the

morning to dress himself, but before his toilet was completed, he fell to the floor, and when found a few hours later, he was mentally confused and unable to rise to his feet, the entire left side being almost completely paralyzed. When I saw him a few hours later, respiration was slightly stertorous; his temperature was about 1° Fahr. sub-normal in the right axilla, and .5° sub-normal in the left; pulse 60, full and strong; respiration 12 per minute. On arousing him, he seemed for a moment to appreciate what was said to him, but if left alone, he almost immediately relapsed into an unconscious state. The left arm and leg were almost completely paralyzed, the paralysis being deeper in the leg than in the arm; the face did not seem to be affected. The tongue was protruded in the median line. No satisfactory test could be made of the general sensory phenomena on account of his blunted mental condition, but so far as I was able to determine, sensation was less acute on the left side than on the right. The knee-jerks were increased, the left to a greater extent than the right; plantar reflexes were absent; ankle clonus was slight on the right and well marked on the left side; cremaster and abdominal reflexes were barely perceptible on the right side, and absent on the left; pupils were equal in size, rather widely dilated, and reacted to light feebly; there was no paralysis or paresis of the external ocular muscles; both optic nerves were slightly atrophied with some swelling of the discs; the choking of the disc was greater on the right side than on the left; there was apparent left bi-lateral homonymous hemianopsia, but it was difficult to test the visual fields accurately; the urine was free from albumen and sugar; the heart presented no evidence of disease, and mucous rales were heard in the lungs. No headache was complained of spontaneously, but on arousing him, and asking him if he had any pain, he said "yes" and pointed to his head. Stupor gradually deepened into coma and he died a few hours later. At the autopsy, an encapsulated, chronic abscess in the centrum ovale of the right side was found, involving the occipital lobe and to a slight extent the temporo-sphenoidal. The pus was thick, greenish and offensive, and the entire right side of the brain presented an oedematous appearance. No pathological changes besides these

were found in the brain. Permission was not obtained to examine any portion besides the head. It is impossible to discuss the probabilities of arriving at a diagnosis soon after the formation of the abscess, which possibly dated back some fifteen or eighteen months before the patient's death, and about the time of the beginning of the head symptoms following a purulent discharge from the lungs. When I first saw the man, a few hours previous to his death, the diagnosis lay between a vascular lesion, tumor and abscess. The eye symptoms were sufficient to exclude a vascular lesion. The syphilitic history and the marked amelioration of symptoms from the use of potassium iodide, pointed to a tumor of syphilitic nature, but the choked discs presented less swelling than is commonly observed in cases of progressive tumor of the brain. In the *Medical News* for March 10, 1894, I reported a case whose history was somewhat similar to that of this. In it the swelling of the optic disc was well marked and a tumor was diagnosticated, and the accuracy of the diagnosis was verified by the autopsy. In the present instance, notwithstanding the strong probabilities of a syphilitic growth, the history of a purulent bronchial discharge immediately preceding the development of head symptoms, and the slight swelling of the optic disc, determined me to venture the diagnosis of a chronic abscess.

Quite recently I put on record the case of a little girl, who was referred to me by Dr. McNaught. She was 11 years of age: had suffered for a length of time from otorrhœa, suppuration in the groin, probably a psoas abscess, and had sustained a severe injury to the head from a fall, all causes of cerebral abscess. She became the subject of epileptic seizures, during which she did not lose consciousness; the convulsive attacks were attended with retraction of the head, at times with opisthotonous, tetanic rigidity of the anus, and frequently with shock-like movements of the arms. There was complete atrophy of the optic nerves, and no evidence of an exudate was apparent in the eyes when I saw her, which was several years after the head-symptoms first became manifest, and some time after blindness, almost complete, had developed; At the autopsy a large cyst connected with a small tumor of the left lateral lobe of the cerebellum.

was found. A more definite diagnosis than that of organic disease affecting portions of the brain in the posterior fossa, was not ventured during life. The history of the seizures without loss of consciousness, talking and throwing the arms wildly around throughout the attack, with distinct clonic convulsive movements and opisthotonus, at first suggested hysteria, but this was easily excluded by the optic nerve atrophy and certain vascular changes in the fundi. If these had not been sufficient to enable me to diagnosticate an organic lesion, the attacks that I witnessed would have been ample evidence of such changes. The posterior neck-muscles were rigid as cords; the head was retracted, the spine arched backwards, and the masseters at times were firmly contracted, so that when she attempted to speak, her teeth, which she was unable to separate, were simply uncovered by the lips, and the arms, rigidly extended, were thrown wildly around with shock-like convulsive movements. Three morbid processes were considered in the diagnosis; namely, abscess, tumor and the results of an old basilar meningitis. The history of a bi-lateral otorrhœa with a very offensive discharge from the ears, occurring about the time of the commencement of her first nervous symptoms, which were attended by a convulsion; the suppuration in the right groin, the origin of which could not, when I saw her, be determined, as there had never been any further evidence of caries of the spine; and the blow to the head received just previously to the convulsive seizures becoming frequent, from an etiological standpoint were about as strong evidence of cerebral suppuration as one expects to find. The sub-normal temperature during the first few days of my observation of the case was in favor of chronic cerebral abscess. The otorrhœa had ceased for a period of nearly ten years, and during this time the child had never complained of pain in the ears. It seemed to me then that if the little patient was suffering from abscess of the brain, the probabilities were against the ears having been the source of the septic poison, as even chronic abscess, due to ear infection, rarely runs a very prolonged course. Headache is common to all the pathological processes under discussion. The optic nerve atrophy without any swelling of the discs was in favor of chronic meningitis and

against the presence of a growth or abscess. I felt inclined to exclude intra-cranial suppuration, but I confessed to the physician with whom I saw the patient in consultation that I had not sufficient reason to be positive in my opinion. Between meningitis and tumor I was unable to decide. One of these morbid processes would have accounted for some of the symptoms, while the second was necessary to explain the others. Almost total loss of sight, with optic nerve atrophy, and seizures attended with opisthotonus, rigidity of the muscles, tonic extensive spasm of the extensors of the limbs, especially of the superior ones, and the shock-like movements of the arms, are found in meningitis of the posterior fossa when the surface of the pons is irritated. So far, the symptoms and theory of meningitis harmonized, but I was at a loss to account for other cranial nerves than the optic escaping. That the child at times should feel quite well, and be entirely free from headache or any apparent discomfort, and that there should be no rigidity of the posterior neck-muscles, except during the paroxysms, seemed to me inconsistent with the theory of an old meningeal exudate in the posterior fossa. A tumor in the cerebellum so situated as to produce remittent pressure on the pons, with distinct paroxysms of increased pressure, is common to the experience of every one who has studied and observed persons suffering from cerebellar growths; but for the pressure-symptoms to be apparently completely intermittent, and to occur with as much regularity as epileptic seizures without loss of consciousness or mental dulness, was new to me in my experience of cerebellar growths.

In the light of the autopsy, which revealed the presence of a large cyst and a small tumor in the posterior three-fourths of the left cerebellar hemisphere, are the symptoms explicable? It is possible, owing to the watery contents of the cyst, that the pressure exerted by the cyst, after it became chronic, on the adjacent structures, was not as great as results from a more solid and unyielding tumor, so that while there might have been a papillitis during the early stage of the growth, the lessened pressure after the formation of the cyst, and the breaking down of the growth, allowed this to subside with the result-

ing atrophy of the optic nerves, and time had permitted all intra-ocular exudate to be absorbed. We know that a growth in the cerebellum, from its effects upon the circulation of the veins of Galen and adjacent veins and sinuses, disturbs the function of the pons and medulla, usually to a slight extent, continuously, and when it has reached sufficient size to exert pressure on the respiratory and neighboring centres, by paroxysms, threatening life by increased pressure, which probably results from temporary œdema of the parts. In the case of a cyst, with yielding contents which may vary in quantity from time to time, the pressure symptoms probably may become intermittent. The peculiar tetanic spasms were most likely due to temporary irritation of the pons and medulla.

With the information gained from the clinical and pathological observations of this case, could error be prevented in the diagnosis of a somewhat similar one? If a large cyst of the cerebellum is attended with more varying pressure symptoms than a tumor, a problematic diagnosis might be ventured, and it might, or might not, be correct. The only uni-lateral symptom in the case, was the tendency of the right arm and leg to become a little more rigid than the left, with, at times, a turning of the head and eyes to the right, but this was inconstant, and of little localizing value in determining which hemisphere of the cerebellum was affected. Had it been possible to localize accurately the lesions, the tumor, in all probability, could have been removed, the contents of the cyst evacuated, and the life of the patient saved. A careful study of the case just reported demonstrates how meagre and unsatisfactory are the symptoms, even of an extensive lesion in one lateral hemisphere of the cerebellum, and that ataxia from lesions of this portion of the brain probably only occurs when they are situated so as to exert pressure on the pons, usually through the medium of the middle lobe of the cerebellum.

It will be seen by a careful study of the cases that I have reported in this paper, that in the diagnosis of chronic cerebral abscess, that while one must be careful to study every symptom, together with the apparent etiology, too much stress must not be laid upon either. Chronic otorrhœa, a blow to the head,

and suppuration in a distant portion of the body, were found in one of my cases, yet the patient died from cyst and tumor of the brain. In another, the symptoms were distinctly indicative of arterial thrombosis, yet the patient died of intra-cranial suppuration. Hitz observed a case in a man 29 years of age who had suffered for sixteen years from otorrhœa, and had besides, received a blow on the head, both being distinct causes of abscess. yet death occurred from tumor of the brain, (Lancet, January 12, 1895, p. 32, Murri). One of Professor Murri's cases of abscess of the brain occurred in a man who had never received a blow or any apparent injury to the head, nor had been the subject of suppuration in distant portions of the body, nor had he suffered from any disease that was likely to cause cerebral abscess, yet death occurred, and the autopsy revealed intra-cranial suppuration. In another one of his cases, there had been suppuration in the tissues which surround the bones of the cranium, suggesting that the organic brain disease was due to suppuration, yet the patient died from sarcoma and encephalic tuberculosis. And again, in another one, the symptoms and apparent etiology pointed to tubercular meningitis, but the patient succumbed to intra-cranial suppuration.

In the diagnosis of chronic abscess of the brain the morbid processes from which the suppuration must be differentiated are, tubercular meningitis, softening, hemorrhage and tumor.

Tubercular Meningitis—Theoretically it does not seem that there should be much danger of mistaking a cerebral abscess for meningitis; but theory fails, and preconceived opinions of the value of symptoms weaken in the stern reality of clinical facts and post-mortem results - not always because the theory is wrong, or the opinions have been based on false premises. There is no portion of the human organism the destruction or irritation of whose tissues gives rise to so clear, invariable and definite symptoms, as that of certain portions of the brain when the lesion is limited and uncomplicated. Irritation of a given portion of the brain will be attended by the same symptoms, no matter how often the irritant is applied, provided the conditions and modifying circumstances are always the same. But the extent of pathological lesions varies, and the degree of irritation

or the amount of loss of function from a similar lesion depends upon so many inscrutable causes, that no two cases will be attended by precisely the same symptoms. Besides, the results of irritation of a portion of the brain, whether it be due to meningitis, softening, hemorrhage or tumor, may give rise to the same general character of symptoms that occur from the presence of an abscess. The majority of cases of tubercular meningitis, even in the adult, run their course in a few weeks, are attended by a febrile process and present symptoms of cranial nerve involvement. While these are the usual symptoms that serve to distinguish tubercular meningitis from chronic abscess of the brain, unfortunately for the diagnostician, they often vary greatly. The duration of some cases of tubercular meningitis is longer than that of chronic cerebral abscess. I reported a case of tubercular meningitis, with continuous symptoms, in a child, to the College of Physicians, in Philadelphia, in 1883, in which the disease extended over a period of more than eight months. In the same paper are collected numerous cases in some of which the duration of the symptoms was a year or more from the time of the first evidence of tubercular disease of the brain to the death of the patient (see Transactions for 1883). Professor Murri, in The Lancet for January 26, 1895, p. 206, reports a case in a man 33 years of age, who had suffered horribly from a headache for a period of five months immediately preceding his death from tubercular meningitis. In this connection he says: "Kratmer refers to a case which lasted four months, and speaks of those of Leitz of forty-two and fifty-four days duration; Gatti of Milan observed one lasting seventy-nine days; and Dickinson noted one of eight months' duration." Rise of temperature is not always found in fatal tuberculosis of the cerebral membranes. It seems to me that we must make a distinction between tubercular meningitis and tuberculosis of the membranes unattended by inflammation. Two years ago I saw and studied with Dr. McLauthlin, a case of tuberculosis of the meninges in a man about 30 years of age. He had been suffering from tuberculosis of the lungs for a number of years, and for several weeks before I saw him he had been depressed in spirits, and experiencing severe headache, but he had not been

attended by any physician. During the week immediately preceding his death, covering the time during which he was seen by Dr. McLauthlin and myself, the temperature was slightly subnormal until a day or two before his death, when it registered from 97° to 100° Fahr. At the autopsy the pia at the base of the brain, especially in the Sylvian fissures and over the optic chiasm, was studded with masses of tubercles, but the microscope showed no evidence of inflammation. In Murri's case, above referred to, and those of others in which inflammatory products were quite abundant, although probably not of recent date, the temperature was normal or sub-normal for a period preceding death. Cranial-nerve symptoms are not invariable in basilar meningitis, and some cases of abscess of the brain are attended by irritation of the cranial nerves.

A condensed report of one of Professor Murri's cases (Lancet, January 26, 1895, p. 207,) will illustrate the latter condition. A male, 35 years of age, was admitted to the clinic August 16, 1890. He was in a state of delirium and some stupor. His wife stated that up to his present illness he had never suffered from ill health. About two weeks before this, or in the beginning of August, he began to complain of headache which became so intense that he could not leave his bed after the 7th of August. His strength gradually failed; his mental condition from the beginning was abnormally irritable and soon became dull. On the night of the 15th, a few hours before admission to the clinic, delirium and stupor first appeared. The patient seemed well nourished. Occasionally there would be muscular twitching when he would give vent to cries of pain in his head. There was slight rise of temperature. Examination on admission to the clinic: Pupils were equal in size; reacted slowly; tongue deviated towards the left; sensory phenomena everywhere dull; spasms and contractions occurred in all the limbs; pulse was 86; respiration 20; temperature does not seem to have been registered; stupor was variable and spasms continued during sleep. Six days later the left pupil was dilated. On the next day, or the 23rd of August, the muscles of the back of the neck were rigid, and the head retracted; there was ptosis of the right eye and deviation of the eyes and head to the right; reflexes were

normal everywhere; general sensory phenomena continued obtuse; smell was absent. On the 25th there was convergent strabismus of the left eye from weakness of the external rectus muscle, and the ball of this eye was painful; the muscles of the left side of the face were weak, and he was unable to protrude the tongue. On the 27th, the left leg and arm showed evidence of weakness, but muscular and posture senses were everywhere good; the pulse was regular; there was nystagmus of the left eye, and tonic spasm of the right arm with flexion of the forearm upon the arm and of the hand upon the forearm; reflexes of cornea and pupil of the left eye weak and slow; the right eye presented normal reflexes; deglutition occurred with difficulty owing to lessened reflex-action of the pharynx; the headache continued intense; stupor deepened each day, and by September 12 the patient was absolutely comatose. The pulse, at that time, varied from 120 to 130, and breathing increased from 24 to 28, and the temperature reached and went above 100.2° on several occasions. He was almost always feverish with the exception of two periods, from August 25 to 29 and from September 3 to 11, during which times the temperature remained at 96.6°. Death occurred on the 14th of September. At the autopsy, all the meninges presented a normal appearance. There were three abscesses; one, pin-head in size, on the anterior right side of pons in vicinity of nucleus of sixth nerve; another, small, in anterior part of left temporo-sphenoidal lobe; a third, and largest, occupied part of right optic thalamus, internal capsule and lenticular nucleus; the lateral ventricle was not broken into. The abscess was rather large and completely encapsulated, and contained inodorous, greenish pus. The parts around the large abscess, including the cranial nerves, were greatly compressed. This case presented the typical cranial-nerve symptoms so commonly witnessed in tubercular meningitis, and as no cause could be found that would have made one suspect intra-cranial suppuration, the diagnosis must have been difficult, if not impossible.

It will be seen that the ease with which tubercular meningitis and chronic abscess of the brain may be mistaken for each other, is much greater than what at first sight would appear. It

is less difficult to point out the dangers of mistakes in diagnosis than to lay down rules by which they may be avoided, but the more we are on our guard the less likely will we be to commit unpardonable blunders.

Cerebral Softening and Focal Encephalitis.—I am not aware that anyone, either in journal articles or text books, has pointed out the danger of mistaking cerebral softening from thrombosis of a cerebral artery, for chronic abscess of the brain Professor Murri reports a case, in the person of a young girl, 17 years of age, of grave chlorosis with chlorotic thrombosis of the lateral sinus and of the cerebral veins. This distinguished observer had made the diagnosis of "Chronic abscess of the left temporal lobe," and from a careful study of the clinical symptoms, it is difficult to see how this mistake could be prevented in a similar case. It was not until recently when I encountered a case of focal encephalitis due to thrombosis of an artery in a young man who presented symptoms which simulated those of abscess, that my attention was called to it. This case is reported at some length in this paper.

About twelve years ago, while practicing in Philadelphia, I was engaged in an elaborate series of observations on the temperature of each side of the body in cerebral lesions, and on the surface temperature of the head and body in health and disease, but the development of pulmonary tuberculosis in my own person compelled me to abandon the work for a number of years. During the past two years, I have resumed the study of the comparative temperature on each side of the body in cerebral lesions, and within the past six months, with the kind and intelligent assistance of trained nurses, both in the St. Luke's and Arapahoe County Hospitals, I have made numerous and interesting observations along this line. It is premature as yet to undertake to arrive at definite conclusions, but the following provisional statements may be made: In chronic paralysis from brain lesions, the temperature on the paralyzed side is equal to or greater than on the unaffected side, when the lesion in the brain is an irritative one, but less on the paralyzed side when the brain lesion is a destructive, non-irritating one. In cases of hemiplegia from cerebral hemor-

rhage, the temperature on the paralyzed side is lower than on the opposite side during the stage of depression immediately following the hemorrhage, but as soon as reaction has become well established, the temperature rises on the paralyzed side to a point about .5° to 1° Fahr. higher than it does on the unaffected side, and remains so for a few weeks, or until, from trophic changes, the paralyzed parts become cooler than the normal side. In cases of hemiplegia from thrombotic origin, the difference in temperature of the two sides of the body at first, is less than occurs from hemorrhage, but if encephalitis results from the arterial occlusion, the temperature on the paralyzed side will equal or exceed the heat of the normal side for weeks, months or even years, and probably as long as the irritation in the brain remains. In one case under my observation at present, the patient having been paralyzed without loss of consciousness two years ago, although great trophic disturbances have become manifest in the paralyzed limbs, yet the temperature on the affected side remains constantly above that of its fellow. In hemiplegia from tumor or abscess of the brain, the temperature in certain cases is elevated on the paralyzed side from .5° to 2° or 3° Fahr. beyond that of the other, the amount of the heightened temperature on the affected side depending upon the degree of irritation in the brain. Theoretically, we should expect to find the difference in the temperature of the two sides of the body greater when the paralysis is due to tumor, than when it results from abscess, but I have as yet been unable to determine this point. Slight differences in temperature always in favor of the same side of the body, extending over a considerable period, are significant, but greater differences may occur for a short time, and denote nothing of importance.

Thrombosis of the cerebral vessels may take place in persons who have been subjected to causes that are known to be capable of giving rise to cerebral abscess. If this occurs in young subjects and is followed by encephalitis, headache, paralysis of one group of muscles after another, and a temperature on the paralyzed side equal to or greater than on the unaffected side, the lesion may be mistaken for abscess, especially if the patient denies syphilis, and presents no positive evidences of it.

Under such circumstances it is probable, although I do not wish to make this point too prominent until further observation enables me to speak more positively, that a temperature on the paralyzed side equal to the normal side or elevated only a few tenths of a degree Fahr. above it, would be in favor of thrombosis, while an increase of heat on the paralyzed side of .5° to 1° or more degrees Fahr. would be in favor of abscess. Further, the temperature in cases of thrombosis of a cerebral artery is, as a rule, less variable, and is more commonly normal than that of chronic abscess. The mental condition in cases of focal softening from thrombosis, while it is blunted, is more nearly normal when the patient is aroused, than in the cases of chronic abscess that have come under my care. There was one observation made in the case of thrombosis reported in this paper, that seemed to point strongly against abscess, and I called attention to it in a clinical lecture the day before the operation. When the patient's leg was first paralyzed, the paralysis was complete in all the muscles of the leg and hip, but during the next few weeks paralysis began to lessen in the hip muscles, and before the patient was subjected to an operation, he was able to lift the leg from the bed and hold it straight at the knee. From what we know of the effects of abscess on the surrounding structures of the brain, from œdema and softening which have a tendency to increase rather than diminish, it seems very improbable that the degree of paralysis caused by an abscess would lessen before the pus is evacuated. If optic neuritis with swelling of the discs were to occur, a thrombotic lesion might be excluded, although hyperæmia of the papilla, with some slight neuro-retinitis, was evident in the eye corresponding to the side of the brain softening in the case reported in this paper. No choking of the disc was observed.

Cerebral Hemorrhage.—It seems useless to discuss the differential diagnosis between abscess and hemorrhage of the brain. The condition presented by the case observed by me of hemorrhage into both anterior lobes of the brain with gradual filling of the ventricles without paralysis, convulsions, or change of temperature to any extent from the normal, must be exceedingly rare. The case was the more confusing because the

hemorrhage followed an illness (la grippe) which has given rise to abscess of the brain.

Tumor.—The diagnosis between chronic abscess of the brain and tumor is sometimes very difficult or even impossible. Professor Von Bergmann and many others, lay great stress upon etiological considerations and the presence of fever, in favor of abscess. But, as we have already seen, the history of middle-ear disease, which Bergmann considers the principal cause of abscess, does not preclude the possibility of tumor. Hitz saw a man who for sixteen years had suffered from otorrhœa, and besides had received a blow on the head, yet he died of tumor of the brain. The case of the little girl, 11 years of age, reported in this paper, illustrates the fallacy of laying too much stress upon etiology. She had suffered from otorrhœa, had had an abscess in the right groin, and had received a severe blow to the head,—all possible causes of abscess, yet she died from tumor and cyst of the cerebellum. Instead of the presence of fever being a symptom of chronic abscess, a sub-normal temperature extending over a considerable period, is more commonly the rule. There may be periods of febrile processes in abscess, but we also find the same condition in tumor. Neither tumor nor chronic abscess free from complications, such as meningitis and distension of the lateral ventricles, are, as a rule, attended by fever. If the temperature record is any aid in the differential diagnosis between these two morbid processes, it is that a prolonged sub-normal temperature, in a case of organic brain disease, associated with evidences of great prostration, such as loss of flesh, strength, appetite, and at times, a yellowish, pale hue of the skin, is in favor of abscess rather than tumor. We must remember that while traumatism to the head is a frequent cause of abscess of the brain, it is also capable of giving rise to tumor. In cases of old injuries to the head dating back more than a year, in which no evidence of inflammation of the brain immediately followed the trauma, the development of organic disease of the brain, supposing the diagnosis to lie between abscess and tumor, the probabilities, other things being equal, will be in favor of the latter. Well pronounced swelling of the optic discs, amounting to $\frac{1}{20}$ or $\frac{1}{20}$ of an inch (requiring +3 D or +4 D

to see the centre of the disc) is always against abscess and in favor of tumor. It is conceivable that an extreme degree of choked disc might occur from abscess, but I have never observed it, and I am not aware that it has been met with by others. Complete blindness is not an infrequent result of tumor, and well advanced amaurosis is very common. In abscess, I have never met with marked amaurosis, and my personal experience in this direction is but confirming the observations of Gowers, Murri and others. Optic neuritis, limited to the same side of the brain as the abscess, is said to have occurred. It must be exceedingly rare, and as the same eye phenomenon has been observed in tumor, it has no practical diagnostic value. In a case of distension of the right lateral ventricle from accumulation of a straw-colored watery fluid, observed by me some years ago, well pronounced optic neuritis was found on the right side, while on the left the eye was normal. Hirt calls attention to the diagnostic value of paralysis of groups of muscles consecutively involved in abscess. This undoubtedly is of frequent occurrence in this disease, but, as paralytic symptoms are found in only about one-half the cases of abscess of the brain, and as the muscular involvement from tumor of the brain sometimes takes place by groups, the phenomenon loses much of its supposed significance in a differential diagnosis. A steady but gradual increase of symptoms of organic disease of the brain with the development of one nerve-root symptom after another, is in favor of tumor, so are prolonged periods during which the symptoms make but little progress.

The only conclusion at which one can arrive after a study of all the symptoms of chronic abscess of the brain is that the diagnosis is often a most difficult one, and sometimes is an object of impossible attainment. The nearest approach to accuracy in diagnosis in obscure cases is to arrive at a conclusion which amounts to a problematic diagnosis between two or more morbid processes. To recommend an operation for the relief of chronic abscess of the brain, only in those cases in which the diagnosis is certain, is to sacrifice many lives that might otherwise be saved by judicious boldness. The physician who has not the courage to recommend an exploratory operation in a

strongly probable case of abscess of the brain lest he may be wrong in his diagnosis, is more solicitious for his own reputation than for the welfare of his patient.

In concluding, let me remind you that if we are ever to reach positiveness and certainty in the diagnosis of obscure brain diseases, it will be attained only by a careful study of minute symptoms, and what often seem unnecessary and tedious details.

DISCUSSION.

DR. LEONARD FREEMAN: I should like to say a word on this interesting paper. There is nothing illustrates better than brain-abscess the fact that lesions of the brain should be referred to specialists. Abscesses of the brain seem to collect about such a specialist; and if he should move to another section of the country the abscesses seem to move with him. In other words, such lesions are difficult to diagnosticate, and are often overlooked by the ordinary practitioner. In viewing brain cases as a whole, from a surgical standpoint, perhaps the most important consideration is surgical cleanliness. If we were absolutely positive of the diagnosis of brain abscess, perhaps surgical cleanliness might not be of quite so much importance; but, as Dr. Eskridge has suggested, it is beyond the power of even the most accomplished diagnostician to always detect with certainty abscess of the brain; it maybe something else. It is wonderful how much handling and how much traumatism the brain will stand without injury, provided it be kept clean. In depressed and comminuted fractures of the skull the brain is often badly lacerated. We can probe it in various directions, and cut out portions of its substance. We can tear the meninges; we can almost sandpaper the brain with impunity, if we desire, without inflammation resulting, providing that infection does not take place. Consequently, infection is one of the most important points in cerebral surgery. We may trephine the skull; we may chisel up flaps of bone, we may open the dura in this manner or in that, but all these things are of minor importance compared with surgical cleanliness. In operating upon the brain for abscess or otherwise, it is important to begin the sterilization of the scalp a day or two before the operation. The

entire head should be shaved. If the patient has a beard, it should also be removed, and the eyebrows in addition. It is a difficult thing, in surgical operations about the head, to prevent the dragging of the sutures through the hair, the beard or the eyebrows, or to avoid touching them with instruments or fingers. The ears should be carefully cleaned, both outside and within, as they must often be included in the dressings; and as the dressings are apt to become saturated with blood and cerebro-spinal fluid, especially if the patient vomit, infection may result from a dirty ear. The dressings should be loose. It has been demonstrated that dryness is a great protection from germ activity; it is perhaps more important than the use of antiseptics. If we use solidly packed dressings, and cover them with more or less impervious bandages (for instance, a piece of rubber dam, as has been advised in one of the recent surgeries), evaporation is hindered and dryness prevented. Hence, it is best to use "fluffed-up" gauze as a dressing, and cover it with a gauze bandage, and not with a muslin bandage or with rubber dam. Gauze is better than cotton for the mass of the dressing, for the reason that gauze absorbs more fluid than the same quantity of cotton. As you have doubtless observed, the discharge from a wound will pass directly through cotton, perhaps in a small spot the size of a dollar, while gauze absorbs throughout its entire substance before the fluid appears on the surface. A layer of cotton should cover the gauze in all its parts, and should touch the skin on all sides, as it is used as a protection from germs more than for absorbing purposes. These may seem like minor points in surgery of the brain, but in reality they are not, as the great danger lies in infection. It seems to me a warrantable statement that those who have not thoroughly mastered the technique of aseptic and antiseptic surgery should not attempt operations upon the brain except in cases of urgent necessity.

DR. ESKRIDGE: Chronic abscess of the brain is a subject of sufficient importance to engage the attention of the Society for a much longer time than we are permitted to give to it. It is remarkable how frequently we find an abscess of the brain when we are looking for it. It is probable that the majority of

cases of chronic abscess of the brain seen by the general practitioner are treated for such conditions as typhoid or some low-continued fever. During the last four or five months I have seen five cases of cerebral abscess. One of these was admitted into St. Luke's Hospital as a case of typhoid fever. The patient was in a comatose condition on admission; still the symptoms indicated a focal cerebral lesion; but the patient's condition was too desperate to hazard an operation. The autopsy revealed an abscess in the right occipital lobe. One point in the diagnosis of these cases, when hemiplegia is present, is that the temperature on the paralyzed side, even months after the paralysis has occurred, will be found as high, and even higher, than on the unaffected side,—just contrary to what we find in lesions of hemorrhagic origin. In a case of abscess of the brain reported by me to the College of Physicians of Philadelphia in 1883, the temperature for a period of four months was higher on the paralyzed side in every instance when the temperature was taken three times daily, than on the unaffected side. The rise of temperature was not infrequently two or three degrees higher on the paralyzed than on the unaffected side. A case of monoplegic or hemiplegic paralysis of brain origin with a rise of from a half to one or two degrees on the paralyzed side over that of the unaffected side, extending over a period of some months, indicates an irritative organic lesion of the brain. For this rise of temperature to have significance it must be uniformly higher. A uni-lateral rise of temperature, which is only occasionally higher, has no significance; but a small rise of temperature on the paralyzed side, continuous over a prolonged period, has some diagnostic importance. I wish to urge again what I have said in connection with this subject. If we are ever to arrive at a definite means of diagnosis of these cases and be able to recommend an operation for their relief, we must observe every symptom and analyze it. Of late much has been accomplished by the boldness of the surgeon in the relief of cases of cerebral abscess. In twenty-six cases operated on by Macewen, twenty-four of them recovered. Scarcely a spontaneous cure from abscess of the brain is on record.

OPIUM POISONING.

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In a paper on "Suicides" which I read before the Denver and Arapahoe County Medical Society in February of 1894, I reported twenty-eight cases of poisoning by opium. I have since then treated twenty-seven, making a total of fifty-five cases, eight of which proved fatal. One died just as I arrived. The other seven lived from one to twelve hours after treatment was commenced, except one man, mentioned in my former paper, who died from inanition after ten days had elapsed. Thirty-nine took morphine, thirteen took laudanum, one aqueous extract of opium, and one gum opium.

The drug was taken per os in all but two instances. In one of these a young man allowed a woman who was addicted to the use of morphine to give him two hypodermic injections of morphine, each containing about a third of a grain, "just to be sociable," to use her own expression. The other smoked opium, and followed it up by taking a large dose of opium internally.

The amount taken varied from three grains to one drachm of morphine, and from half an ounce to three ounces of laudanum.

Thirty-five cases were already so far under the influence of the drug when first seen as to necessitate the use of the stomach-pump for the evacuation of the stomach. The remainder of them were seen early enough for emetics to be of service.

The symptoms caused by opium when taken in poisonous doses may be divided into three stages: First, that of increased nervous excitability; second, a condition of somnolence or drowsiness; and lastly, the stage of narcosis.

The duration of the first two stages varies greatly in different cases. When a very large dose is taken, the first may be entirely absent, or may last only a few minutes. The patient in this stage acts not unlike a man partially intoxicated. The heart's action is increased, the face is flushed and the imaginative powers are increased. If the case is one of attempted suicide, the patient often tells, while in this condition, what he has taken. The second stage is of short duration if the dose

has been a large one, its length increasing as the dose is diminished. If but little more than the medicinal dose has been taken, this stage lasts for several hours, and is followed by a return to consciousness. The condition at this time very closely resembles sound sleep. The respiration and pulse are normal, or nearly so, and the pupils are contracted. The patient, when aroused, is often annoyed by a violent itching of the skin, sometimes general, but more often confined to the face, especially the nose.

In the third stage, opium poisoning is sometimes differentiated with great difficulty from uræmic coma, alcholic narcosis, cerebral hemorrhage, and the condition following an epileptic convulsion.

In uræmic coma the pupils are usually normal or dilated, but may be contracted, convulsions generally occur, and anasarca is usually present. The urine is always loaded with albumen and the temperature is said to be always below normal.

In alcoholic narcosis the pupils are normal or dilated, the respirations are not as slow as in opium poisoning, and the pulse is slow and full. Too much dependence must not be placed on the odor of alcohol, as the patient may have taken opium while intoxicated. A hypodermic injection of apomorphia will cause a man unconscious from alcohol to vomit, but will have no effect if the case be one of opium poisoning. In case of cerebral hemorrhage there is usually more or less paralysis of the cranial nerves, with some difference in the reflexes of the two sides of the body, and in the size of the two pupils

In the coma following an epileptic convulsion, the tongue will probably be bitten, the pupils dilated, and the respirations but little slower than normal.

The history and surroundings are often more valuable aids to diagnosis than the physical condition. The occurrence of a convulsion at the beginning of the attack will exclude opium poisoning, although it may occur in any one of the other conditions named.

The prognosis in the first and second stages is usually good. In the third stage it is uncertain. Drunkards recover poorly, and the prognosis should be guarded when a drunken

man takes opium, even when there is only slight absorption before the case is seen.

There are two objects to be attained in treatment. First, to remove or render harmless the opium still remaining in the stomach, and second, to support the vital functions until the poison has been eliminated from the system, or, if possible, destroy it in the blood without waiting for the slow process of elimination.

The first of these indications can be met by emetics, the stomach-pump, or by permanganate of potash. Of the emetics, apomorphia is probably the best, because the quickest. One-tenth of a grain should be given hypodermically if the case is in the first or second stage. It should never be given in the third stage as it will not produce emesis after unconsciousness has supervened, and may cause dangerous heart depression. In fact, I am inclined to the belief that it has helped to cause a fatal result in some of my cases in this way. It will, however, act at a later stage of opium narcosis than any other emetic with which I am acquainted, so if an emetic is to be given at all I prefer the apomorphia. It is better to risk its bad effect on the heart than to fail entirely in producing emesis, unless a stomach-pump is at hand.

When a pump is available it should be used instead of an emetic if the patient is nearing the third stage, or, in other words, when he can only be aroused with difficulty.

Although the apomorphia produces no effort at vomiting when administered to an entirely unconscious patient it seems to depress the heart even more than when given to a partially conscious person.

When the pump is used, the stomach should be filled with warm water and repeatedly emptied until the water is returned clear. The stomach should then be filled with hot, strong coffee. When apomorphia is to be given, the patient should be induced to drink as much water as possible while the hypodermic syringe is being prepared. If this is postponed until after the injection is given, nausea sometimes comes on so quickly that it is hard to induce the patient to drink a sufficient quantity to liquefy the contents of the stomach.

After the unabsorbed opium has been removed by the emetic or stomach-pump the respiration and circulation should be kept up by stimulants, of which there are a considerable number in use. I place the greatest reliance in strychnia, giving it in the form of the sulphate in doses of $\frac{1}{25}$ grain hypodermically as often as the respiration or pulse becomes weak. Atropia I consider useless and I no longer use it except when it becomes necessary to do so to avoid censure from other physicians. Digitalis is of undoubted value when the pulse is weak. Aromatic spirits of ammonia acts nicely, especially when there is sudden failure of the heart's action. The inflammation which often follows its injection makes its use objectionable. I am undecided as to the merits of nitro-glycerine. I do not favor the external use of cold water for the purpose of keeping the patient awake, as it is too depressing. Beating or abusing a patient for this purpose is also unjustifiable. The faradic current applied to the face and neck is much more efficient and leaves no bad effects. In many cases of opium poisoning, death has undoubtedly been due to the shock and exhaustion caused by the long-continued beating and forced walking to which the patient has been subjected by the well-meaning but misguided attendants.

The beneficial effect of the faradic current is no doubt due principally to the fact that it causes pain or at least an upleasant sensation and thereby keeps the patient aroused. The current should therefore be strong enough to be decidedly unpleasant and metal electrodes should be used. If a faradic battery is not obtainable, the next best thing is to keep the patient aroused by talking to him, pulling his nose, slapping him lightly and similar procedures. Under no circumstances should he be dragged around the room between two men or severely beaten. Cases which recover under that style of treatment recover in spite of it and not on account of it.

The galvanic current, when available, is of undoubted benefit in stimulating respiration.

I have tried dilatation of the anal sphincter. It is no more beneficial than any other procedure which would cause an equal amount of pain, and I think it unjustifiable. I hold the same

opinion in regard to the rectal injection of irritating substances, such as tincture of capsicum.

In the *New York Medical Record* of February 17, 1894, Dr. Wm. Moor published an article advocating the use of permanganate of potash as an antidote to opium. He had taken as much as two grains of sulphate of morphia, followed by the same amount of the permanganate, without feeling any effect from the dose. The remedy became famous in a day, although at that time it had not been tried except in the experimental way mentioned. Since then about thirty-five cases have been treated with this agent and reported, and a considerable amount of discussion has taken place in regard to its action. In all the cases I have been able to find reported, the usual remedies have also been used, and the result of the entire treatment has been about what I would expect without the use of the permanganate.

In Dr. Moor's last article on the subject, published in the Philadelphia Medical News of May 4, 1895, he makes the following bold statement: "I say that any physician on arriving at the side of a person suffering from opium poisoning, who does not at once administer to that person a sufficient quantity of the permanganate, commits an act of gross negligence." He then goes on to state three different indications for the use of the drug. The first is to neutralize any opium which may remain in the stomach. This is effected by giving a sufficient quantity of the permanganate internally, well diluted. He allows one grain for each grain of morphine which has been taken. If the patient is sufficiently conscious to swallow, and the permanganate is certain to render the opium harmless, and I believe it is, this treatment does away with the danger of heart-depression which I have already mentioned as sometimes following the use of apomorphia

The second indication, as given by Dr. Moor, is to destroy the morphia contained in the circulating blood through hypodermic injections of the antidote. That sounds very nice in theory, but I have put it into practice with disastrous results. I was called to a man who had taken a large dose of morphia. The quantity could not be ascertained, neither could the time

at which it had been taken, but he could not be aroused in the slightest degree. The respirations were four to the minute, and the pulse was weak and rapid. His stomach was emptied and thoroughly washed out, and then filled with hot coffee, and my usual treatment was carried out. At the end of two hours he had recovered sufficiently to fight vigorously when the faradic current was applied to his face. He spoke and nodded his head in answer to questions several times, and vomited the coffee which had distended his stomach. This case occurred soon after the permanganate treatment was first announced, and I had not as yet had an opportunity to try it. I had provided myself with a 2 per cent. solution, and as the case now seemed in a fair way to recover, I decided to hasten the recovery by destroying the morphin which was still in the circulating blood, to use Dr. Moor's expression. At intervals of about five minutes I gave hypodermic injections of the 2 per cent. solution, giving twenty minims at each injection, until I had given 100 minims, which would equal two grains of the drug. The patient had by this time relapsed into insensibility, the pulse was very weak and rapid, and the respiration shallow. Happening to notice that the skin was very warm, I took the temperature, and was surprised to find it 102½° in the axilla. It went up steadily to 103°, 104°, 105° and 106°, reaching the latter point before death, which occurred about five hours later. The treatment after the permanganate was used, consisted of hypodermic injections of strychnia and digitalin. No autopsy was held.

In another case, where a woman had taken two ounces of laudanum, I repeated the experiment with a smaller amount, giving sixty minims of a 2 per cent. solution after evacuating the stomach by the use of apomorphia. The woman was sleepy, but was at no time unconscious, and I did not consider her condition serious, as I had been called a few minutes after the dose was taken. Ten minutes after the permanganate was injected the temperature was 100½°, in thirty minutes it was 101°, in forty minutes 100¾°, and it then went down, being normal eight hours later. On the following day there was again some tem-

perature, due no doubt, to the inflammation which had occurred at the site of each of the three injections.

In two other cases in which I used it hypodermically I failed to take the temperature. Both were seen before the second stage was fairly ushered in, and both recovered, as I have no doubt they would have done without the permanganate, and so far as I could judge, the course of the cases was not modified by its use. In every case except the fatal one, there was considerable local inflammation following its injection.

The third of Dr. Moor's indications is to decompose the alkaloid that returns from the circulation to the stomach. To accomplish this, he advises giving from time to time a tumblerful of a weak solution internally. When a permanganate solution is allowed to remain in the stomach a few minutes and is then withdrawn, it has lost its characteristic color and also its deoxidizing power, just as it does when a few drops of acetic acid are added to the solution. After the stomach is repeatedly washed with a solution of two grains to the pint, the fluid returns unchanged. The conclusion I draw from this is, that to have the permanganate retained in an active condition it is necessary to wash the stomach out with it often enough to temporarily stop the acid secretions from the mucous membrane of the stomach. When this is accomplished, the elimination of morphin from the blood by the stomach is necessarily also stopped. Therefore, if given in large quantities, it stops one important channel by which the poison is eliminated from the blood and is useless if given in small quantities. My position on the use of permanganate, stated briefly, is as follows:

Taken internally, it renders harmless opium which still remains in the stomach.

It is useless or injurious when given hypodermically. It is useless or injurious when given internally for the purpose of decomposing the opium which may return to the stomach through the circulation.

DISCUSSION.

DR. HALL: It is a very interesting report of cases. I want to speak of one method of poisoning which I have not seen referred to as commonly as it should be. I have seen several

children poisoned with opium, and in this way: they had received the ordinary dose of laudanum for children at that age, from a bottle which had been left uncorked; the alcohol had evaporated and the solution became somewhat concentrated. They thus received a greater portion of the opium than they otherwise would have done.

There is another matter in connection with this, which throws some light on the absorption of poison from the stomach. Some eight years ago I reported a case in the Boston Medical Journal of a man who took, about 8 o'clock in the evening, 250 one-eight grain pills of morphine. These were stolen from the same drug-store where I had had prescriptions put up, so that I knew them to be of good quality. There was no blame on the part of the druggist that the man got them. He took the entire number before 9 o'clock. I saw him two hours after he had taken them, or had begun on them, for, in the drug-store they found that a bottle had been stolen, and knowing this man had been there, they suspected him, and commenced hunting him up. The man had been drinking heavily, and as I say, he had taken more than thirty grains of morphine inside of an hour. At the end of two hours from the time he began taking these pills I saw him. He took them in three separate doses, say about ten grains at a time. At the end of two hours he did not show the slightest symptoms of opium poisoning. There was no question whatever that he had taken the entire amount. At that time we gave him an emetic of mustard. He vomited profusely; and then nothing else seemed to be indicated, inasmuch as there were no symptoms. After watching him several hours I left him alone. There is no question whatever that more than thirty grains of morphine remained in his stomach between one and two hours, and yet during all that time no symptoms developed.

DR. ESKRIDGE: This is a subject of considerable importance, but I will only go into the discussion of one point raised by Dr. Johnson. During a little over six years I have had charge of all the poisoning cases admitted to the County Hospital. Up to nine months ago we had not a record of a single case of death. I attributed it to the fact that strychnine had

not been given in the early stage. I think it has been demonstrated conclusively that belladonna does stimulate the respiratory center, and that in the early stage of opium poisoning, belladonna is an active and reliable agent. Dr. Dercum of Philadelphia has shown that strychnine is more or less of an antidote to belladonna, and that in cases of belladonna poisoning where belladonna had been given for the relief of opium poisoning, strychnine has revived the patient when there seemed to be danger of the toxic effects of belladonna. Professor Wood and others have demonstrated the fact that you can not kill an animal with morphine so long as you can make it breathe. You may give ten to twenty times the dose required to kill an animal, but if you keep up respiration the animal will not die. Taking all these facts together, then, remembering that keeping up respiration is the most important point of the treatment of opium poisoning, after all the opium possible has been gotten rid of, that belladonna is one of the most active respiratory stimulants known; and further, that strychnine is a stimulant more to the cerebro-spinal centers than to the respiratory centers, while it is an active agent in stimulating respiration, it is not as active in the early stage as belladonna; I think we may conclude that belladonna is of use in the early stage for stimulating the respiratory centers. The danger of giving strychnine early in opium poisoning is in tetanizing the muscles. A number of cases of opium poisoning have been admitted to the County Hospital that have not succumbed directly from the opium poisoning, but from the exhaustion which followed. If we stimulate the muscular system early in opium poisoning the patient will likely die from exhaustion after the poison has been gotten rid of. Strychnine is one of the most reliable agents in treating cases of opium poisoning when used late in the lethal condition at the time when a reliable cardiac stiumlant is desired. Belladonna should be used early or not at all.

DR. AXTELL: Dr. F. E. Waxham exhibited an instrument before our local society some months ago for use in cases of opium poisoning. It consists of an intubation tube introduced into the larynx and connected with a bellows apparatus by means of which air was introduced into the lungs by force; in

his exhibition of the instrument at that time, he stated that it had been used and had proved to be a success.

In regard to the use of atropia in opium poisoning, I fully believe that it is of service not only in the early stages, as Dr. Eskridge suggested, but can be used and is of service in the late stages. In my early practice I saw a patient who had taken two grains of morphine. I saw the case one hour after the injection of the poison, and the stomach at that time was empty. By an overdose of atropia sulphate given not purposely but by mistake, I substituted atropia poisoning for the opium poisoning. The change in symptoms was remarkable. From the infrequent respiration, we had a hurried respiration; from the dull stupor in which the woman had been previously, she became animated and rapid in her conversation; the pupils became dilated, and in fact the entire array of symptoms was changed. It was such a marked transition that the influence of the two drugs stood out clear and antagonistic.

DR. WALKER: I wish to emphasize what Dr. Eskridge has said with regard to the early administration of strychnia, and I hardly think that Dr. Johnson advises that treatment any more than he would recommend alcoholic stimulants in acute inflammation. I remember a case which I had where I gave large doses of strychnia, and never contented myself with a total of two-fifths or half a grain. In this case I gave seven $\frac{1}{8}$-grain doses of strychnia in less than seven hours. The woman was unconscious for nine hours, and no method would show the slightest sign of consciousness. Respiration would become imperceptible for three or four minutes, and the pulse fail until it could barely be felt; then she would be given an eighth-grain of strychnia hypodermically; and within a minute or a minute and a half, respiration and pulse would be so much improved that there would seem a bare chance for recovery. At the end of nine hours of unconsciousness, recovery commenced, and was rapid, though there remained for several hours slight cramps of the muscles of the trunk and lower extremities. I believe that without plenty of strychnia she would certainly have died, and I was several times on the point of leaving her, and reporting her dead.

DR. ESKRIDGE: Dr. Johnson did not state when he used strychnine, but I infer from his condemnation of belladonna that he advocates strychnine early. A number of cases of morphine poisoning have been admitted to the hospital two hours after taking morphine, and at that early stage they were already tetanized from strychnine which had been used in the treatment.

DR. JOHNSON: I never give strychnine in opium poisoning until the respiration becomes very slow, or the pulse very weak. I do not think I have ever given strychnine within two hours of the time morphine was taken. I certainly never give it until its use is indicated by the symptoms, and I have never pushed strychnine to the extent of tetanizing the patient, except in a few instances where there were contractions of the muscles for a few minutes, which quickly passed off, and then the strychnine was not repeated until the respiration or pulse again demanded it. I know that belladonna is a favorite remedy for opium poisoning, and as stated in my paper, I give it when I think physicians are going to criticise me for not giving it; but I have no faith in it—I never did see any good effects from its use, and I have seen bad effects where it was given in too large doses. I never believe in substituting atropia poisoning for opium poisoning.

CASTRATION THE REMEDY FOR CRIME.

B. A. ARBOGAST, M. D., BRECKENRIDGE, COLO.

It may be I should ask not only your indulgence, but your pardon, for the few remarks I have to make on the above subject.

The problem of how to care for our pauper and criminal classes is crowding itself upon all modern thinkers in all parts of the civilized world, and as population and wealth increases, the pauper and criminal classes present to the sociologist, economist and philanthropist a full realization of the fact that the only worthy aim of a system of relief is the restoration to the ranks of normal manhood and womanhood of those criminals who are

capable of such restoration, and the speedy extinction of those who are beyond the possibility of such help; and again, we are well aware of the prudish sentiment of our people in speaking so radically of how to solve the problem. Crime becomes more revolting as civilization becomes more refined, despite the fact of constantly increasing facilities for the amelioration of the vicious and criminal classes in all communities; for never has there been a time in the history of the world, when each and every individual had such an opportunity for self-improvement as now. We have the example of good homes, good schools, churches, reformatories, hospitals, jails, penitentiaries, and the gallows finally, after the human brute has spread sorrow and desolation (often worse than death) to countless and untold innocent and pure and helpless of our society.

Vice and crime are nothing else than the sickness of the social body, and the physician is the true one to suggest a remedy and apply the treatment. Castration, with our antiseptic surgery and anæsthesia, is painless and safe, and would have a greater deterrent effect on the vicious than our penitentiaries or the gallows, besides leaving the subject as useful in many respects as before, minus his vicious impulses, and with a certainty that his kind would eventually be exterminated. I doubt if any one would object to the treatment being applied to the psycho-sexual monster, the Sadist, and the rapist has such a perverted sexual instinct that very often when once his lust is aroused it is entirely beyond his control, and the greatest cruelty is resorted to, to accomplish his hellish design.

Together we aim at the conservatism of American liberties, a higher standard of American citizenship, the ends of universal justice, the evolution of a nobler humanity.

Government we must have, for defining and protecting civil rights; and it has an inherent right to determine what shall be the character and the rights of its citizens. Consequently, it has the right and also the obligation to provide appropriate means and facilities for the formation of such a character for every citizen as the nature of the government requires.

We assume, therefore, that the proper treatment for all our citizens is such as will best fit the whole being, his physical

first; so that his intellectual and moral being can be trained for the real obligations and duties of a citizen.

We have no right to assume however, that because the individual has been created with all his animal desires in excess of his moral responsibility, that government shall not interfere by taking away his ability to perpetuate his kind and thereby reducing to the minimum the evil of the individual and increasing the security and comfort of the law-abiding citizens. For no punishment is complete which does not primarily aim to annihilate the evil with the least suffering to the individual. If national and state governments have a right to say what kind of quarantine to establish to save their people from some scourge or pestilence, or say what kind of sewage a city shall have to prevent disease, then it is logical to say it has the right and it is an obligation it owes to the upright and just, to speedily exterminate certain classes of criminals.

It is not necessary to state to this Association the established fact of hereditary taint. It also seems to be a fact that among all the lower animals the plan outlined is carried to a successful issue, with happy results, while the divine human animal is entirely an accident, left to the caprice of chance; and when they have spread death and desolation all around them they are compelled to commit suicide in Canon City, with only half the good accomplished that might be, had they been healed of their evil desires and thereby having a very much greater influence over others. I repeat, the physician should of all others be the one to suggest the reform indicated, as every thought in the mind of a real physician who is a true economist, should be directed toward the physical improvement of progeny. Witty criticisms and faithless conservatism must give way to truth and to intelligent public opinion.

The human species is the highest type of animal life, and the highest development of man that has ever been attained was among the Greeks. Among the Spartans the greatest care was taken that there should be no propagation of those who were mentally or physically defective. The time has come in our civilization when there should be a revision of our laws to such an extent that it shall not only be unlawful for near of

kin to marry, but that confirmed criminals and vagrants should be rendered incapable of reproducing their kind. It has only been a few days since, that a notorious female thief, named Sophie Lyons, was said to be plying her vocation in Denver, and her son was serving a term in an eastern state prison for crime, only to be released to be again arraigned for the same offence, the posterity of such a woman is a constant menace to any city or state. All professional and confirmed criminals should, before they are liberated, undergo an operation that would effectively prevent their procreation. He was a wise man who said that "to produce a high type of intellectual and physical development in the individual it is necessary to begin two hundred years before the birth of the child." All breeders of domestic animals are extremely careful and particular in selecting their males and females for such purposes, and the inference to be drawn from this is, that all men and all women should not be allowed to mate or marry. It is ours, as physicians, to teach the better doctrine and contemplate the loftiest and most inspiring spectacle of "federation of the world" on this point to which medicine is surely feeling its way.

ASEXUALIZATION FOR THE LIMITATION OF DISEASE AND THE PREVENTION AND PUNISHMENT OF CRIME.

E. STUVER, M. SC., M. D., PH. D., RAWLINS, WYO.

Self-preservation is the most deeply implanted of all organic instincts, and next to this, the sexual instinct or passion has exerted a greater influence on the progress and development of the human race, and has done more in shaping and moulding mankind, and thereby controlling the destinies of nations and civilizations than any other single cause.

During the savage, barbarous and semi-civilized stages of man's development, when all his powers are fully utilized in waging a constant warfare with the elements and forces of nature by which he is surrounded, and in bringing himself into harmony with his environment; when all the forces of his im-

perfectly-evolved and differentiated nervous system are required for the stimulation of his varied and comprehensive mental activities, the sexual functions are, in the main, limited to their proper sphere and exercised in accordance with natural laws. When, however, large populations become aggregated in cities: when wealth accumulates and class distinctions become well established, and the distance between the extremes in the social scale are greatly increased; when the masses, dazzled by the ostentatious displays of the wealthy and so-called leisure classes, ape their manners and strive to occupy a similar plane; when, in the mad rush for wealth, and the relentless pursuit of position, power and fame, we have a great potential intellectual capacity which has been developed through countless ages of conflict with all the forces of nature, now confined to the narrow grooves of special activities which call only a small part of this comprehensive brain-power into legitimate activity and at the same time unduly stimulate, excite and by constant strain finally break down the few faculties called into requisition, while from lack of proper exercise, direction and control those not utilized take on a perverted activity; when luxury, idleness and the artificial shams of a so-called advanced and advancing civilization have stimulated and perverted the sexual function and have prepared a fertile soil for the rapid propagation and dissemination of venereal diseases of all kinds, the numerous organized philanthrophical agencies of our modern society come to their aid and, by the most painstaking care and attention, snatch thousands of disease-contaminated victims from an untimely grave, help to neutralize the beneficent effects of Nature's law which has decreed that the fittest shall survive, and by establishing new foci go on spreading the dread infection and still further polluting the life-giving stream of our physical and moral existence and lowering the health and integrity of our people; when, I say, we find all these influences in active operation, it is time for us, as a profession, to consider what means can be adopted to avert the impending dangers.

Those who penetrate beneath the mere surface-facts of history will perceive the great truth that all the mighty nations of antiquity have passed through regular stages of development

corresponding to the periods of infancy, childhood, youth, manhood and old age or decadence in the individual. They are born, pass through a vigorous youth and finally reach a glorious manhood, honored and respected for their splendid achievements, and then, attacked by insidious, devitalizing maladies, gradually decline and pass away. Through the dim twilight of history we see flitting before us the spectres of ancient Egypt, Persia, Greece, Rome and other powerful nations of antiquity. The causes that led to their downfall should serve as beacon-lights to us, pointing out the rocks on which they were wrecked and lost.

The great problem ever presenting itself to the philosopher, humanitarian and especially to the physician has been, how can these noblest fruits of advancing physical and intellectual achievement be most surely retained and perpetuated and the insidious causes of degeneration and decay most certainly prevented from infecting and poisoning the life-blood of our nation and race? Belonging, as we do, to a nation whose efforts during its earlier stages of development have been crowned by the grandest achievements and the most wonderful progress the world has ever seen,—before whose young manhood there open up vistas of such glory and greatness as to cause every pulse to bound and every soul to thrill with joy and pride, it is difficult amid such surroundings as these for us not to become infected with the general spirit of optimism with which our national atmosphere is so strongly charged and not to believe that *our nation and race* are destined to prove exceptions to the past and reverse the teachings of all history and human experience.

Could we have but stood among the victorious Greeks when the arrogant Xerxes and his Persian hordes were driven from their beloved shores; could we have been in Italy when Hannibal was compelled to relinquish his career of conquest, or when the invincible legions of the conquering Cæsar returned in triumph to Rome, we would have found patriotism just as pure and hopes just as high as those that animate our breasts to-day. It is needless for me to remind this audience that ancient Greece with all its glory has departed forever; that Imperial Rome which ruled the world, remains only as a reminiscence of

the past. With warnings like these wafted back to us from the departed nations of the past, it is the duty of every true American, and especially of the medical profession whose members have been in the van of human advancement and human elevation, to penetrate the most hidden recesses in the haunts of vice and crime, and expose to the search-light of truth the foul ulcers that are creating such havoc throughout the length and breadth of our land. Nor should this investigation be confined to any particular class of society. It should include all classes from the highest to the lowest, because many of the highly-perfumed and bejeweled swell aristocrats are in just as deplorable a condition as the most degraded denizens of the lowest slums, and being able, to a large extent, to conceal their true condition and deprive disease and vice of their most repulsive features, are far more dangerous to the health of the community than the most degraded.

It is admitted by many of our most eminent medical authorities, that venereal disease is the *bete noir*, the one black cloud that is rapidly overspreading our sky and threatening our physical health and national integrity. The celebrated surgeon, Prof. S. D. Gross, strongly insisted that most blood diseases were due to this cause, and that scrofula and so-called scrofulous diseases were merely modified manifestations of syphilitic infection.

I believe the fact is fully proven by the testimony of criminologists, sociologists, humanitarians and all who make a careful study of the subject, that most of the crimes of the vicious and criminal classes are due directly or indirectly to sexual perversions or to inordinate and uncontrolled sexual passions; and that the vicious and criminal classes transmit their diseases and a tendency to vice and crime to their descendants, is no longer a debatable question. A case in point clearly illustrating this fact is that of the notorious Jukes family. R. L. Dugdale in his little work ("The Jukes: A Study in Crime," etc., 1877). reports that in seven generations, a single abandoned home bequeathed to the world 1,200 descendants, a large majority of whom were idiots, imbeciles, drunkards, lunatics, paupers. prostitutes and criminals (*vide* "Journal American Medical

Association." Vol. XXIV, p. 304), and that the crimes of this single family had, in seventy-five years, cost the public over $1,250,000, without reckoning the cash paid for whisky or taking into account the establishment of pauperism and crime of the survivors in succeeding generations and the incurable disease, idiocy and insanity arising out of this debauchery and reaching farther than we can calculate (*vide supra*).

With such conditions as these, patent to everyone, the question naturally arises, what can be done to mitigate or remedy these evils and prevent their perpetuation? Some remedy that will accomplish this object is all the more necessary because with the development of modern civilization there has been a growing disposition to dispense with the death penalty and other harsh punishments of by-gone ages; indeed, so strong has this sentiment become, that many of our States have abolished the death penalty entirely, and in all it is only inflicted for the most heinous crimes.

Along with a more thorough knowledge of the criminal classes and an appreciation of the influence of inherited tendencies and physical degenerations and perversions as exciting causes of crime, there has grown the conviction that our present system of dealing with vice and crime is far from satisfactory in its results, and that instead of improving or reforming those brought under its influences, it almost invariably makes them worse or serves to intensify their evil propensities. Then, too, it is continually becoming more apparent to thinking minds that many punishments are not in harmony with the progress of modern thought--that is, that instead of being modelled on Nature's laws and following as a natural or logical sequence the offenses committed, they are too often inconsistent and arbitrary, and tend to do more harm than good.

Everyone will admit that the frequent outbursts of popular fury that result in the lynching or possibly torture of the perpetrator of some atrocious crime, have a very demoralizing influence, not only on the lynchers themselves but on the whole community and all within the range of their malign influence.

This state of the popular mind certainly shows a lack of faith in the sufficiency of existing penal statutes or in the efficiency of their administration.

All punishments should have a three-fold object in view: first, to punish the criminal and thereby satisfy the demands of justice; second, to deter and intimidate those who would commit similar offenses, and in this way protect society against their depredations; and third, to effect the reformation of the criminals themselves. As we have before seen, existing methods largely fail in accomplishing all these results, and the question arises, how can the problem be most easily and effectually solved, giving adequate protection to society, limiting the number of criminals in the future and at the same time treating the confirmedly criminal and defective classes with the greatest humanity and justice.

The old saying, "An ounce of prevention is worth a pound of cure," occupies an honored position in all therapeutical systems and is the foundation on which most of the enduring triumphs of scientific medicine rest. If this time-honored maxim could be made to exert as great an influence in shaping legislative enactments as it has exerted in directing scientific investigations, we would soon witness an immense decrease in the prevalence of disease, vice and crime. Since the exciting causes of the propagation and dissemination of venereal diseases and those leading to the large class of crimes already indicated are almost identical, I shall not call attention to these two branches of the subject separately, but proceed to state what, in my mind, will prove to be the most effective remedy for these evils.

In asexualization we have a preventive and curative measure that more fully meets all the requirements of the problem than any other remedy that could be proposed.

In the first place, if applied as it should be to all hereditary and chronic criminals of both sexes, it would immediately and permanently, produce a marked diminution of disease and crime. because, by removing their exciting cause,—perverted sexual passions, it would at the same time remove the great incentive that leads to the commission of the one, and the debauchery and license that spread the other. While accomplishing this object it would be a most effective punishment for the criminal, and exert a greater influence in intimidating and deterring others

from the commission of similar crimes than any penalty that could be inflicted because, next to death, this punishment would inspire a greater terror and aversion than any other. Does any one for a moment doubt that a number of living, walking examples of this kind, scattered throughout our southern states and branded on the forehead, if such a measure were deemed necessary to accentuate the effect, would not have a greater influence in limiting the number of cases of rape than all the lynchings and tortures that could be inflicted? This punishment would not only more effectually protect society, but by removing their exciting cause prevent those outbursts of popular fury which have such a demoralizing effect on the people.

If, as indicated above, many of the most common and revolting crimes are directly traceable to sexual perversions, does it not follow as a corollary of this proposition, that by attacking the source of the evil we will do more to check crime and stay the progress of its attendant companion disease, than we could accomplish in any other way? While such a punishment as this, if applied to all chronic criminals and defective classes would almost immediately show itself in a decided betterment of society and the elevation of the race, its far-reaching influence on the society and civilization of the future in raising the physical, intellectual and moral health of the people would be immeasurably greater. Nor is this all; by removing the reproductive capacity of the criminal classes, their numbers, both relative and absolute, would rapidly diminish, and those that remain would be greatly benefitted in every way, their evil propensities would be held in check or entirely eradicated, and a large percentage, from being vagabonds and parasites continually preying upon and terrorizing society, would be transformed into contented, productive and useful citizens.

That these results would follow asexualization, is borne out both by analogical reasoning based upon the results observed in the lower animals, and by the testimony of many eminent authorities who have carefully noted its effects on large numbers of persons in Oriental nations.

Some will probably claim that such a punishment as this would be an invasion of the sacred rights of individual liberty,

and for that reason, should not be inflicted. All I have to say to this is that our Government is based on the principle of "the greatest good to the greatest number," and that no maudlin sentimentality should be allowed to stand in the way of carrying this principle into effect.

Everyone living under our present civilization must surrender many of his individual rights and conform to the laws of the society in which he lives; when his actions interfere with the general good or become a menace to the community, he is subject to punishment, even to the forfeiture of life; and, furthermore, it has never been customary to consult criminals as to the kind of punishments that should be inflicted upon them and I do not believe the time has yet arrived to adopt such a course.

In conclusion, I desire to say that if these propositions and the deductions from them are well founded, asexualization of confirmed and hereditary criminals as well as those defectives who transmit their defects to posterity would have the following results--viz:

1.—By removing or modifying their exciting causes or favoring circumstances, it would greatly limit the dissemination of disease, vice and crime.

2.—It would furnish a humane and rational punishment for a large and continually increasing number of criminals and satisfy the demands of justice.

3.—Owing to the innate repugnance towards this condition, it would be a powerful deterrent and thereby limit the prevalence of crime and protect society against the criminal.

4.—By removing the pro-creative capacity of criminals and defectives, it would do more to diminish their numbers and protect society against their ravages, while at the same time raising the physical, intellectual and moral standard of the race than all other punishments combined.

5. -It would be the humane and rational method of treating these classes, because it would protect them against harsh and brutal punishments, and by removing the cause of their obliquities, transform many of them into useful and productive citizens.

In this connection I desire to call your attention to a very

able and instructive article read by Dr. Robert Boal, of Lacon, Illinois, before the Illinois State Medical Society May 15, 1894 and in the Journal of the American Medical Association September 15, 1894.

DISCUSSION.

DR. BLAINE: I have listened with considerable interest to both of these papers that have been read. Anything that has for its object the betterment of society is always intereresting. This comes properly before a medical body. The idea of asexualization is one that is growing every day, and one that should ultimately come into practice. The time will come some day, when it will be necessary to limit the criminal classes in some way or other.

The statistics of the past ten years up to 1894 show that only two per cent of the persons accused of murder have been actually hanged; so that it is evident that a great many of them have gone free that should have been punished. With the progress of abdominal surgery and gynæcology, it has become very fashionable to remove the ovaries from the woman. It is also very fashionable to limit the size of families in certain classes of society, so that at the present rate of increase in one case and decrease in another, the time may come inside of a very few years when the criminal classes will have the advantage, and will be in a position to dictate to those that are now making laws, and castration may turn in the other direction and the criminal classes will be in a position to castrate the better class of society. If this idea is going to be carried out at all, (and I think it ought to be) the time to begin is now, and keep on agitating the subject until something shall be done. I only know of one state in which the effort has been made to pass a law of this kind; that was last winter in the state of Texas. Dr. Daniels, who has been agitating this subject for some three years, in a recent letter informed me they had a law introduced last winter with this idea in view, but owing to the rush of business at the close of the session, nothing was done; so I know of no state that has a law of this kind. If this is ever going to be done it ought to be attended to now, and can only be accomplished

by the agitation of physicians and jurists and I think the physicians are the proper ones to start the ball rolling.

If all sexual crimes were punished by castration it would not only limit this class of crimes in the present generation, but would effectually prevent transmission by heredity.

DR. STODDARD: I am very sorry I did not hear these papers.

In relation to castration as being a cure or prevention of crime, I can hardly think that it will accomplish the purpose. We have had a good deal of experience in the removal of the ovaries from women, and I do not think that it has prevented them or taken away their tendency to be criminal. Again, we know that from the history of the colored eunuchs of former times, there were probably no greater criminals on earth than they were. History tells that very plainly, and if removal of the testicles is going to prevent crime or prevent persons from being criminal, I think that has been a very good test. Whether removal of the testicles will remove also the sexual appetite, is a question I do not know anything about. I know that removal of the ovaries from the female do not take away sexual appetite. In fact, it has sometimes increased it, and I am not sure whether, in the male, removal of the testicles will remove the appetite.

DR. DAVISON: I do not think the gentleman who last spoke has arrived at the right idea of the reading of these papers. It seems to me it was not so much the criminal himself who was to be benefited, but thereafter to be no further propagation of his kind.

PRESIDENT WORK: That is right, doctor.

DR. STODDARD: I just took the subject of the paper, that is all, Mr. President, as the basis of my remarks, and therefore I stand corrected.

THE RESTRICTION OF TUBERCULOSIS.

PROF. VICTOR C. VAUGHAN, ANN ARBOR, MICH.

Of the 63,000,000 people living to-day in the United States, 9,000,000 or more will, unless something be done to prevent it, die of tuberculosis. In the census year of 1890, 102,199 deaths are reported as due to pulmonary tuberculosis, or consumption. To the reported deaths, not less than 30 per cent. should be added in order to arrive at the actual number. When this computation is made, it will be found that the annual number of deaths in this country from pulmonary tuberculosis amounts to nearly 133,000; I know of no reliable data from which we can ascertain the number of deaths from tuberculosis of other organs than the lungs. However, knowing as we do that every part of the body, the skin, the muscles, the bones, the nervous system, the abdominal and pelvic viscera, are all occasional, and some of them frequent sufferers from the invasion of tubercle bacilli, we will hardly be accused of exaggeration when we state that in all probability this micro-organism is directly or indirectly the cause of not less than 150,000 deaths in this country each year.

Leyden gives the ratio between annual deaths and the total number of infected persons as one to seven, and Williams states that the average life of the consumptive among the better-to-do classes of England is eight years. Accepting Leyden's estimate, we see that an average of 150,000 deaths annually indicates that the total number of persons in this country to-day infested with tuberculosis amounts to 1,050,000, or one out of every sixty of the population.* These figures are probably too small. Germany has a population equal to about three-fourths that of this country, and Leyden stated before the International Congress of Hygiene and Demography at Budapest last September, that the number of consumptives in the German Empire is not less than 1,300,000, and that the annual deaths from this disease in the same country range from 170,000 to 180,000.

*The census of 1890 is used as the basis of these statements.

However, the estimates which I have given are sufficiently large to render the subject of the restriction of tuberculosis worthy of the consideration of every one who is interested in the welfare of the human race. It should, however, be borne in mind that unless some effort is made to prevent it, the mortality from tuberculosis will increase with improved facilities for travel and the greater ease with which the consumptive invalid, even in the advanced stages of the disease, mingles with and infects the healthy.

It should be stated that the figures given above include only those cases in which tuberculosis progresses and causes death. The number of persons actually infected is indeed so large that one hesitates to give it. The records of autopsies show that not less than one-third of all men have tuberculosis during some period of life. Bollinger found tubercular lesions in 27 and Massini in 39 per cent. of all cases examined. In 200 post-mortems made by Harris, and in which special attention was given to the detection of evidences of infection, the results were positive in 38 per cent. In the examinations made at the Paris morgue, the per cent. of cases in which tubercular lesions, active or quiescent, are formed is, according to Bouchard, as high as 75. Biggs of New York found tubercular changes in 60 per cent. of the bodies examined by himself. In 125 autopsies made at the Foundlings' Home in New York the bronchial glands were found to be tuberculous in all. Even when there are no indications to the eye of tubercular infection, the presence of the germ may often be shown by the inoculation of guinea-pigs: thus, in eight out of thirty cases, in many of which there were no recognizable tubercular lesions, Loomis demonstrated the existence of the bacillus in the bronchial glands by the inoculation of animals.

Tuberculosis is a disease which is frequently arrested in the first stage, but it is also true that it often progresses through the second stage and terminates in death. At first, it is due to an unmixed infection. The tubercle bacillus finds its way into the human body, develops slowly, and in a large per cent. of the cases remains but feebly active or dies out entirely, leaving the lesions so frequently observed in the autopsies referred to

above. In the information which we get from these post-mortem examinations of the bodies of persons dead from accidental causes, or from diseases other than tuberculosis be correct, and I see no reason for doubting the authenticity of statements made by so many men skilled in the recognition of pathological lesions, then it must be true that tuberculosis, so long as it remains an unmixed infection is not one of the most fatal of the infectious diseases. The history of inoculation tuberculosis, which has been accidentally induced in man, confirms this view. The instances in which surgeons, pathologists, butchers, dealers in hides, children circumcised by tuberculous Rabbis, and others, have been accidentally inoculated with this disease, are observed with sufficient frequency to enable us to know quite accurately the history of the disease when thus acquired. In these cases the disease remains for many years, often through life, a local affection; its progress is slow, and it seldom produces death.

Although the tubercle bacillus can be induced under specially favorable conditions to multiply on artificial media, it is in nature an obligate parasite, and does not reproduce itself outside of the animal body. Obligate parasites do not speedily destroy their hosts. It is not conducive to their best interests to do so, because their continued existence depends upon that of their host, or on their transference to another host. This is true not only of tubercle germ, but of the bacilli of leprosy and syphilis. Furthermore, man is not so susceptible to the tubercle bacillus as some of the lower animals are. A pure culture of this micro-organism will speedily kill a guinea-pig, while, as we have seen, its growth in man is slow and liable to temporary and even permanent arrest.

The tubercle germ unaided by saprophytic micro-organisms seldom kills. One-seventh of the human race in civilized countries die of tuberculosis; but one-third more are infected with the germ. Therefore, in the difference between one-third and one-seventh, or in nearly one-fifth of all men, the disease is present at some period of life, but does not cause death. Of the 63,000,000 of people now living in this country, 21,000,000 have been, are, or will be infected at some time, but only

9,000,000 will die of tuberculosis, leaving 12,000,000 who will be infected, but in whom the infection will not progress to a fatal termination.

In the second stage of tuberculosis the disease becomes one of mixed infection. Other pathogenic or even saprophytic germs are carried into the infected tissues, and finding there a soil rendered favorable to their growth by the previous specific infection, begin the process of tissue disintegration. It is probable that the many cases of pulmonary consumption which apparently have their origin in attacks of influenza and bad colds are explainable in this way. The individuals are already tuberculous, possibly have been so for many years; the acute inflammation of the respiratory tract brings with it, or is due to the secondary infection, and for the first time tuberculosis is recognized. The sudden appearance of miliary tuberculosis after measles and whooping-cough is probably another illustration of the same thing. That this is the case in pneumonic phthisis, there can scarcely be any doubt. Indeed, the post-mortem examination often shows bronchial glands which have evidently been tuberculous for a long time. There has been much said and written about a pre-tubercular stage; there is no evidence of the existence of any such a condition as a diseased state. On the other hand the tubercles often exist long before the disease is recognized, and in many in whom no lesion of a tubercular nature is suspected until the autopsy reveals it.

That the bacillus discovered by Koch in 1882 is the primary and essential cause of all forms of tuberculosis, no intelligent and well-read medical man will now deny. Without specific infection the disease does not and can not exist. While this germ does not destroy every body which it invades, and probably does not, unaided, produce death in many, without it no great amount of saprophytic infection can cause tuberculosis. Bad colds, influenza, pneumonia, measles and whooping-cough do not originate consumption.

The exhaustive researches of Cornet, extending through the years of 1887, 1888 and 1889, and since confirmed by others, have revealed the manner in which tuberculosis is disseminated. The air exhaled from the lungs of the consumptive, even in the

last stages of the disease, is germ-free. The sputum in cases of pulmonary tuberculosis, the discharges from the bowels when sputum is swallowed, and in intestinal tuberculosis, the urine in case of involvement of this excretory tract, the discharges from tuberculous sores on any part of the body, the milk and flesh of tuberculous animals are the media in which the germs of this disease exist outside of man's body. As has been stated, the tubercle bacillus does not reproduce itself outside the animal body, excepting under certain artificial conditions. The number of tubercle germs in the sputum on the floor or in the cuspidor does not increase; but in its resting or spore form, it may, under certain conditions which ordinarily exist, retain its vitality indefinitely. The consumptive spits on the floor, and then the sputum dries. The housemaid's broom may scatter the contained germs from time to time; some will settle on the walls, others on the furniture, and still others on the floor again; her broom and brush may knock them about from place to place, day by day, and she may consider herself a fortunate maid if, sooner or later, the micro-organism does not find its way into her lungs.

As many of you know, Cornet collected dust from various sources, and tested the same for the bacilli of tuberculosis by the inoculation of guinea-pigs, These studies showed that the dust taken from rooms occupied by consumptives who were in the habit of expectorating on the floor or in their handkerchiefs, frequently contained the bacillus, while the dust from rooms occupied by those consumptives who were careful to use cuspidors, and never spit on the floor or in their handkerchiefs, was free from the germ. The bacilli are transmitted from man to man or from animal to man. The disease never originates in any other way. The transfer is, as a rule, an indirect one, and we are often unable to ascertain the route by which it is made, but we know that every case of consumption comes from a preceding one. Tuberculosis is a disease which is largely due to infected houses. Flick has shown this to be the case in Philadelphia. Cornet found that 62.88 per cent. of all the deaths which had occurred in thirty-eight cloisters during twenty-five years were due to tuberculosis. Baer ascertained that from 40

to 60 per cent. of the total mortality in prisons in Germany may be ascribed to the same cause. These figures show what alarming fatality may follow restriction to infected houses and rooms. Cornet calls attention to the fact that the mortality from tuberculosis is greatest in those cities where the largest number of people have no homes of their own, but move about from house to house. In this manner one infected house may shelter and destroy the susceptible members of many families in the course of a few years. According to Cornet, the following figures give the annual mortality per 1,000 inhabitants from tuberculosis in the cities mentioned:

London	2.9	Paris	4.1	Wiesbaden	2.9
Glasgow	7.0	Berlin	3.8	Liverpool	6.4

He does not claim that the frequent interchange of dwellings in the last mentioned cities is the only cause of the great mortality, but that it is an important factor.

When the consumptive knows how, and properly attends to the thorough destruction of the germs thrown off from his body, there is no longer any danger of his becoming a center of infection. Residence in a properly conducted hospital, arranged especially for the care and treatment of tuberculous patients, would be perfectly safe. The danger of infection in such a house would be much less than that to which the traveler subjects himself every time he passed a night in a hotel. In the latter instance one is assigned to a room, the condition of the previous occupants of which is wholly unknown to him. The bed may have been occupied by a careless consumptive who has scattered the seeds of the disease about him. Wherever we go, we are in danger of being infected, but if certain well known rules should be followed in detail, the infected and the uninfected might mingle without danger. The bravest man may hesitate to walk through a jungle which conceals a single savage beast, but the timid one does not hesitate to approach a whole menagerie of caged lions. Cornet has shown by positive demonstration that, of all places examined by him, where people congregate, the one most free from the chance of accidental infection is the properly equipped and kept surgical operating

room. Here one is less liable to infection than he is in the open street, in the best kept hotel or in a private house.

Frequently we hear it stated that only the weak and feeble acquire consumption and the fittest survive. A more heartless, false and unscientific statement was never made. If a man with a loaded gun should be placed at every street corner, his eyes covered, and then all the inhabitants of the city should be marched down the street, and the men with the guns told to fire into the procession as it passed, would any sane man say that only the weak and feeble or the morally bad would be injured? Every soldier in battle is not killed or wounded, although all may face the fire of the enemy. Of two men receiving like gun shot wounds, one may survive and the other die, but the chances of life are greatly increased if neither is wounded. The tubercle germ may kill one and not another, but it injures more or less every person who inhales it. It may develop rapidly in one, slowly in another. Its growth may be continuously progressive in one, while in another it may be temporarily and in a third, permanently arrested. While there undoubtedly are differences in susceptibility with like exposure, with no exposure the most feeble and unfit will not acquire tuberculosis, and with sufficient exposure, there are probably none sufficiently robust to remain immune to this disease. To this the people of Colorado should give special thought. Your climate has a well deserved reputation of prolonging the lives of consumptives, and they come to you from various parts of the world. This would be all right, if these living bacteriological culture flasks were not permitted to scatter their contents about them. Mentone once had the reputation of being a most excellent place for the climatic treatment of consumption, but the invalid visitors coughed and expectorated on the streets and in the houses, until the disease became fearfully prevalent among the native born. The following quotation is taken from an article by Bennet, who practiced medicine at Mentone for many years, and who, at the time of writing this article, did not believe tuberculosis to be infectious. He says: "During the last few years phthisis has become much more common at Mentone, among the girls and young women, than it formerly was,

especially among the washerwomen, a numerous class; and contagion from the linen soiled by the sputa of consumptive patients has been suggested as the cause. I am disposed myself, to attribute the undoubted increase of phthisis in a healthy southern locality to other causes; to the mere change in habits and occupations. When I first settled in this region in 1859, nearly the entire population was agriculturally occupied. All the young women of a village lying on a mountain side a few hundred feet above a property of mine were thus engaged, working at the soil with their father and brother, carrying stones and earth in baskets on their heads. They were fine, healthy, robust girls and women, fed on maccaroni, olive oil and wine, worthy to be *matres hominum*, mothers of men. I often had a half dozen working for me in this way, tripping lightly over the rocks and hillsides, heavily weighted. I employed them at that time with some compunction, which I should not feel now. Times have changed; the Grimaldi girls have all become town workers, washerwomen, sempstresses, servants, and they begin to die of consumption. Is it not because they work in close, badly ventilated, damp rooms, instead of in the open air? Is it not again a question of rebreathed air, not of contagion?"

The authorities of Colorado Springs and other health resorts in this State should profit by the lessen taught at Mentone. I do not propose to discuss the relation of climate to consumption, but if I may be permitted, there are a few facts which have been largely overlooked and which I believe to be important. A given place may be a good one for an infected person to live and an equally good one for the uninfected to shun. There is no evidence that climate gives immunity to this disease. Acquiring tuberculosis and arresting its progress when once acquired are different things. The best thing to do is to avoid the former. The place to avoid infection is not where there are no consumptives, because there is no such spot known in the civilized world, but where the consumptive disinfects the sputum and does not expectorate on the floor or in his handkerchief. It is true that it is not a good thing for the consumptive to inhale new supplies of the tubercle germ from time to time. In this way new arrears of lung tissue become involved, and the

disease extends; but, as we have seen, the tuberculous person must especially endeavor to prevent the engrafting of a saprophytic infection upon the specific one already established. Therefore, an aseptic atmosphere is the one in which the consumptive should live, and the more nearly aseptic the atmosphere, the longer, other things being equal, is the infected person likely to live. I will not claim that there is no value in altitude, relative humidity, etc., *per se*, but I do hold that an air free from pyogenic and putrefactive micro-organisms is the one where our patients do best, whether it be on the plains of Egypt or on the mountain tops of Colorado. Dryness of the air is conducive to the alleviation of consumption, because to the extent to which it is dry the air is aseptic. Sunny climes are beneficial, because bright sunshine is a most potent germ-destroying agent and its effects extend over large areas. The large proportion of cloudless days which you have here in Colorado constitutes one of the valuable features in your climate. The purifying effects of the sunlight are undoubtedly intensified by the rarity of your atmosphere due to your altitude. No one can deny the value of climate in the treatment of tuberculosis, and all agree that your climate has proven to be of pre-eminent value in its good effects upon this class of invalids. However, believing as I do, that sapropyhtic infection plays so important a role in the progress of tuberculosis, I must emphasize the necessity of attending to local sanitary conditions. There is no part of the earth possessed of a climate so salubrious that man may not vitiate its good effects. After some years of experience in advising tubercular patients in regard to climatic treatment, I have come to the conclusion that I will not send any more of them away from home, unless they will promise to place themselves under the care of some physician, who, I know, will be willing and capable of advising them in the choice of a residence. I believe that a consumptive who lives in a house well ventilated and well drained in Michigan is more favorably located than he would be living in an unsanitary house in Colorado. Of course, if he can be out of doors most of the time he is better off here, but even then, if he must sleep in a small, unventilated, dirty bed room, it is questionable whether

or not it is wise to advise the change. With organic matter to feed upon, and with heat and moisture, saprophytic germs will thrive and find their way into the lungs or those who inhabit the house which those micro-organisms infest.

All of the preceding is the introduction to what I wish to say concerning the restriction of tuberculosis. Fortunately for you, however, the prologue is longer than the body and conclusion of my discourse.

Bearing in mind the two points which I have endeavored to enunciate, I will proceed. First, however, let me restate these two facts which I believe to be of fundamental importance. They are as follows: (1) Primarily, tuberculosis is, in many cases at least, an unmixed infection, and in this form it seldom proves fatal. (2) When tuberculosis becomes a mixed infection, its natural course is to terminate in death. We are to restrict the disease by preventing the primary infection. How can this be done? Only in one way, by the destruction of the infecting agent. The places where the tubercle bacillus is found outside of the human body have already been enumerated. We must stop the sale of milk and meat from tuberculous animals. This can be done by the inspection of animals in the dairy and in the stock-yards by competent, skilled veterinarians. The experiments of Ernst and others have shown that milk may, and often does, contain the bacillus, even when no local lesion on the udders exists. No one should be allowed to sell milk without a license, and this should be granted only after the employment of the tuberculin test. Whether any part of the carcass of a tuberculous animal should be eaten or not may be regarded as a question yet unsettled, but none of us would like to eat the flesh of such an animal, and there would be no meat-famine should it be wholly excluded from the market. Moreover, if this test were universally applied, the spread of the infection among cattle would be greatly lessened, and from an economic standpoint it would pay. I have great confidence in the tuberculin test as applied to cattle. Only a few days ago I saw it tested on one of the finest herds in Michigan, and every cow which gave a reaction revealed at autopsy a tubercular lesion.

The greatest work must be done in the disinfection of the sputum and other germ-containing excretions from the human body. Much good can be accomplished by the circulars now being quite generally distributed by Boards of Health, but this agency is insufficient and incomplete. There are details which even the most conscientious and intelligent are not likely to get from the most explicitly worded, printed directions, and these details are all important in the accomplishment of our object. When we recognize the fact that we must teach the unlearned and careless as well as the intelligent and painstaking, the inadequacy of printed directions becomes all the more evident. To depend wholly upon such information would be like teaching chemistry exclusively from text-books. The most intelligent student can not become a skilled bacteriologist with the best library in the world on the subject, unless this be supplemented by practical work in the laboratory. If the trained student need such practical demonstration, how much more must they be essential to the patient who generally is wholly without scientific knowledge? The surgeon who has had no laboratory instruction in bacteriology continues to lose his patients after operations by neglect of the details of asepsis. How, then, can we expect the factory girl with tuberculosis to carry out the details of the disinfection of her sputum so thoroughly that she will cease to be a center of infection? Lectures from the wisest and books by the most learned can not, unaided by practical work, make successful farmers or mechanics. The details necessary for the complete destruction of the agents of infection can be taught only by practical illustration. Schools for the instruction of consumptives in the methods of taking care of themselves and preventing the spread of the disease to others should be established. This would result in lengthening their own lives, in rendering them more comfortable while they do live, and would save many others from infection. These schools should consist of model hospitals, where the consumptive would be both patient and pupil.

I believe that every State should establish one or more hospitals for the education and treatment of its consumptives. Possibly it would be better if the general government should

undertake this work, and by the proper selection of sites, the advantage of climate would be added to other therapeutical measures employed. These hospitals would have a two-fold use. The training of its inmates in methods of restricting the disease would be of untold benefit, and it is now generally conceded that the institutional treatment of the disease is the most successful. Only in such institutions can the dietetic and hygienic treatment be carried out satisfactorily, and all will agree that this is of more importance than the use of medicinal agents. At the Falkenstein hospital for consumptives it is stated by Leyden that the cures amount to twenty-four per cent. and I am sure that this can not be equalled in private practice, even when aided by the specially favorable climate of Colorado.

But, says one, the experiment, which you propose would be, if carried out, an expensive one. This is true, but is it not also true that we are paying heavy tribute to this plague at present. How much loss in money do the 150,000 annual deaths from this disease entail? How great a financial loss will it be to this country when one-seventh of those now living become its victims, many of them after years of sickness, during a larger part of which time they will be unable to earn their daily bread? I will not attempt to name a money value of these lives. The question is above any financial consideration. It is one of the welfare of the human race.

Has anything of this kind ever been done? Yes, fortunately we have a parallel in the method by which leprosy was eradicated from Europe. Hirsch tells us that after the wars of the Crusaders, leprosy became fearfully prevalent all over Europe. Our ancestors recognized the fact that there was only one way of ridding themselves of this plague. At one time, according to the same authority, there were no less than 1,900 leper hospitals or retreats in Europe. The leper must live in one of them. He could go from one to another, but if he traveled by day, he was compelled to wear a distinctive garb by which he could be recognized and shunned, and if by night, he must carry a bell, the constant tinkling of which would warn those whom he should meet. Now, by a much more humane

method, we can, and our descendants will, I believe, stamp out tuberculosis. In the plan which I propose it would not be necessary for every consumptive to go to such a hospital, nor would it be necessary for even the incurables to remain in these places indefinitely. The intelligent tubercular patient may live in intimate relation with his family, so soon as he knows and will practice the rules necessary to prevent infecting others. There is nothing cruel in the proposition which I made. On the other hand, it has everything to recommend it from a humane and even a sentimental standpoint. A distinguished German writer on tuberculosis has stated that the "healthy should be considered before the sick." I would say that every comfort should be extended to the invalid, and that there should be no suffering in this world which human skill can relieve.

THE GERM THEORY.

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A story is told of a sea captain, one of whose crew, while working in the rigging, fell to the deck below, fracturing his leg. The captain, upon his return to London, went before the medical faculty and reported the case, stating, as there was no surgeon on board, he had ordered the leg tightly bound with thin strips of steel and strong cord, the day after which the man was able to use his leg and walk as before the accident. He respectfully asked the medical faculty to consider the matter, and offer such explanation of the phenomena as they were able. Upon his return from another cruise, he again appeared before the honorable medical body for their explanation. They assured him that they had given deep thought to the case as narrated by him, and had arrived at the conclusion that the result was undoubtedly due to immediate union of the bone, which, though rare, they were free to believe had taken place, and in this they all concurred. The captain, having listened with due respect and interest to their learned dissertations upon the subject, remarked, that in his statement of the facts there was one

point omitted which might have some interest to them, viz: that the leg fractured was a wooden leg.

It is related of a certain pepular debater, when asked why a given result always followed a given phenomenon generally accepted as true, replied cautiously: "Would it not be well to inquire into the facts in the case? Perhaps these results do not always follow."

A very large majority of the medical profession are to-day ready to explain why a given disease follows the introduction into the body of a certain microbe, and are ready to frame laws for the governing of those people who are so unfortunate as to be afflicted with certain diseases by them presumed to be caused by the presence of a germ. Would it be out of place at this time, before explanations and legislation go further, to inquire into the facts. It may be barely possible that this theory of germs might have some features about it analagous to the captain's case of fracture.

There is before the medical profession no subject of so much interest to itself or importance to the people as that of the cause of diseases. Upon its proper solution depends in a large measure the success of treatment in individual cases, and our ability to protect the public health. And upon its proper appreciation hangs the personal liberty of no insignificant fraction of the people of the world.

I desire to say in the beginning, that I have no disposition to underrate the importance of the germ theory of disease. I am very willing to admit that this theory, which numbers among its adherents a very large majority of the members of our great and noble profession, (a profession which contains as great a ratio of independent thinkers as any class of men in the world) must seem to be well nigh proven; must certainly have excellent arguments in its favor, and must of necessity contain sufficient germs of truth to be entitled to our careful and respectful consideration. But we must not forget that since the world has had a history, many theories have been propounded, and for the time established and accepted by the wisest men, which in due time have been proven wholly untrue. It is truly astonishing, when some observation has given rise to some hypothesis

and the observer seeks to establish its truth, how many circumstances he can find in confirmation of it, and, in his zeal, how easily he can overlook or explain away circumstances and facts which seem to stand in opposition to it. If his hypothesis be in the line of a theory in explanation of some hitherto unexplained phenomenon, and is heralded as coming from some source well considered for scientific research, it is marvelous how many will be found ready to adopt every statement and deduction upon the most casual examination, or many times no examination at all. So well known is this tendency to reach out after new and many times false gods, that the argument or general concensus of opinion, is now rarely urged in support of the truth or falsity of any proposition. It is therefore incumbent upon us to exercise great caution in our acceptance of all theories. I do not mean by this statement that we should require more than convincing proof, but I do mean that it is the respective duty of each of us to insist that every reasonable doubt arising in our minds regarding the truth of a proposition be satisfied, before we, individually, accept and adopt it. In no case can we, as representatives of a learned profession, afford to discount investigations, results and conclusions; but, having carefully examined in every detail the evidence adduced, and having joined it with thoroughly established facts already known in connection with the subject, we should render our verdict, not upon what we believe, but upon what we know to be true. At the present time there seems to me to be no better basis for the classification of diseases than that afforded by their clinical history and morbid anatomy, as is demonstrated by anti or post portem examination. And I feel impelled to offer my protest against the recent and growing custom of classification according to bacterial presence, for reasons which will appear hereafter.

Since medicine has had a history, many reasons have been assigned as the cause of disease. Indeed, this subject has always been prominently before the profession. In very early times it was considered than an evil spirit entered the body and perverted its processes. In more recent times, we hear of some noxious agent entering the body, setting up diseased processes,

some morbid material of unknown composition but of mighty potency, which is considered the prime cause of our physical troubles. Still later we hear of many causes tending to pervert the various body functions, thus modifying cell proliferation and development. Still the idea of an entity has never been fully dispelled, and, especially in contagious diseases, this *materies morbi* has been persistently sought. Finally the bacteriologist claims to have found it, and during the past two decades we have been entertained with accounts of numerous minute organisms, which, having been found in one connection or another wherein putrefactive tissue has been submitted to the microscope, said organisms, because of their presence, have been accredited with having produced the disease. Observers have thus at different times and places attributed the cause of a single disease to various microbic forms, and each been absolutely sure that his is the true specific bacillus which causes the disease. This confusion of statements has of itself given rise to serious doubts regarding the truth of the germ theory, though when carefully considered, many of these conflicting statements can be accounted for by the very different methods pursued by observers in preparing their specimens, the media employed for cultures and different agents used to color the microbic forms. As more regular methods have been adopted in these investigations, more uniform results have been obtained, and confidence in the germ theory been accordingly increased, though it would appear that these results prove but one thing, which might have been conjectured in the beginning, viz: that organisms of any kind developed in suitable media are capable of reproducing themselves, and, in similar media and under similar conditions, an organism will develop in similar form. Again it has been observed, that not only the microbe, which is considered the essential one in a given disease, is found in it, but vast collections of various forms are also present at the same time, and further, that the microbe *per se* may be found in the body when no disease process is apparent. It is then claimed by the advocates of the theory, that said germ can find no favorable nidus for its development, hence is innocuous. In this connection it would appear, that if a

microbe is the essential cause of a diseased process, it should be capable of building for itself a suitable nidus for its development in the healthy body. If unable to do so, and is dependent upon finding a diseased tissue in which to develop, then of necessity we must assign as the cause of the disease that perversion of function or structure which occasioned the development of the favorable nidus. The germ in that case can be considered but an accidental form, which, without the peculiar structures afforded by the diseased process, would have been unable to be present, as there would have been neither suitable media, or condition for its development.

Again, it would appear that the simple presence of a so-called specific microbe in a given disease does not prove its causal relation, even though, after being separated and introduced into another unaffected body, its introduction is followed by a similar type of disease, and the introduced bacillus is therein multiplied indefinitely; for, if we assume that a specific microbe is found in a body affected by a given diseased process, and is found in no other, we can account for its presence there only upon the hypothesis that this diseased process affords the material necessary for its growth and development. If this be admitted, and I think it must, it is no great strain on our imagination to assume, inasmuch as we know that the contagion of most contagious diseases is capable of action when in extreme attenuation, that enough of this contagion is introduced with the microbe to account for the phenomena independent of the microbe itself, that it, the microbe, is able to multiply and develop, may be owing to the action of the contagion and consequent development of its necessary media. We are all familiar with the action of starch in the presence of ptyline; a contagious principle might possess analogous properties. Again, we are instructed that it is not the bacterium itself which occasions the disease symptoms, but that a secondary product or ptomain is formed as a result of their development, which, poisoning the organism, induces these phenomena. It must be admitted that a microbic form developing and multiplying in any media, must do so at the expense of its surrounding substance, and in doing so must, in a measure, change

the composition of said media by appropriating from it the materials necessary for its growth. If this be the case, it must of necessity follow that a form subsisting entirely upon the peculiar abnormal ingredients of the body fluids existing in a specific disease, must certainly diminish that free poison by just so much of it as they require for their development and growth, and to that extent are beneficial and protective to the diseased body. As to poisonous ptomains, it is shown by experiment that culture of certain germs in certain media do give rise to certain ptomanic poisons, and that cultures of the same germs in slightly different media develop no such ptomanic poison. Eberth's bacillus does not produce any ptomain when cultivated in a peptone solution, but in beef tea it produces a poisonous alkaloid; hence, we must conclude that the poisons depend not upon the germs, but upon the peculiar composition of the nutrient fluids in which they multiply. Brown has shown that the mycoderma aceti converts ithylic alcohol into acetic acid, propylic alcohol into propionic acid, and has no effect upon methylic alcohol. In the human body, whose fluids supply the materials, not only for the comparatively few bacteria which may be present, but in the myriads of cells which form the tissues and fluids of which it is itself composed, it would seem more reasonable to assume that the diseased process so changed the nutrient fluids of the body that the abstraction of such elements from it as are required to nourish its own cells gives rise to these poisonous ptomains, instead of attributing this phenomenon to the comparatively insignificant amount of material abstracted by foreign cells. We are all familiar with the perversions of secretions, which are among the first evidence presented of the onset of a disease, and that ptomanic poison may develop in the human body without the agency of bacteria we have proof in the oft recorded cases of this phenomenon occurring in the milk of nursing women, as the immediate result of a profound nervous impression.

Again, we must not forget that specific cell-forms might result from changes in the nutrient media. Koch admits that the form of cells is variable, and Buchner has succeeded several times, by virtue of his culture media, in developing, from the

Hay bacillus, the bacillus of anthrax, and from the anthrax bacillus back to the former, in which it lost its power to produce the anthrax disease. Nageli, Davaine, Buchner, Wernich and Verchow maintain the theory of mutability of germs, both regarding their forms and morphological characters, while Koch asserts their specific species and tenacity of morphological characters. It is barely possible that Koch may be as much disappointed in these characters of germs as he was regarding the effect of a certain lymph which bears his name. There would seem to be no scientific objection to this theory of mutability. The eminent Charles Darwin, than whom the world has known no greater naturalist, has seemed to prove the variation in plants and animals which has led to the formation of very distinct species, and asserts that as we go down the scale to lower forms of life these variations are more marked; hence, in such low forms as fungi, consisting of but a single cell, a marked change in the nutrient media and other environment might induce such a change in some of the cells as would render them unrecognizable, and if these changes were of a nature to be under the conditions advantageous to these cells in the general struggle for life, they would, by virtue of this advantage, be preserved and increase more rapidly than their less favored associates. The tenacity of the morphological characters of various forms would also appear to be of little weight as an argument against their mutability. If we admit that a contagion in minute quantity is capable of inducing a disease, and one case of a disease of inducing an epidemic, we must admit its power to multiply itself; and if a germ has chanced to develop in such form that its selective properties give preference to this contagious substance, so that it subsists largely upon it, we might expect it to carry in its substance enough of that contagious poison to infect the media employed for its culture, in which case, the media being congenial it, the contagion, as well as the germ, will multiply itself. If the contagion multiplies in equal or greater ratio with the germ, the next germ taken from this culture for the next, the amount of media being also proportionate, will carry with it as much of the contagious poison as the first, and so on indefinitely. But if the germ

multiplies more rapidly than the contagion, or the amount of culture media be great, or inappropriate for the development of the contagious element, each culture will have the contagion in greater attenuation, until finally a germ will be developed which carries so little of the contagion as to be innocuous, and in this manner, I think, might be explained the tenacity with which some germs adhere to their morphological properties, and the variation of others in this respect. In support of this theory, Nageli affirms that it is possible by cultivation to so alter the properties of a bacteria that it has no longer the power to induce the changes associated with it. And Vaughan says, "It has been proven by experiment that a germ which will become virulent when cultivated in one certain medium, may in a different medium be rendered inert, and not produce the same ptomain. In fact, we know that some animals are thoroughly immune in relation to the effects of certain bacteria, while others are very susceptible; white rats are naturally immune *to* anthrax; mice are immune to glanders." Vait says, "The power of exciting fermentation is probably possessed not *only* by bacteria and yeast-cells, but by the cells of higher organisms and of man," and refers the disintegration of the soluble albumen circulating through the system to the fermentative action of tissue-cells. Pasteur has shown that in proper condition, fruits and leaves may exhibit fermentative properties. And Vaughan says, "It is not true that one specific germ is the only one which can or will produce a given effect. There are other germs beside the yeast plant which can and do produce alcohol, so also the germs which produce tetanus are not always the same, nor will they act in the same media of cultivation. For instance, the tetanus germ of Kitasato, when cultivated in bullion, is virulent, while the tetanus germ of Tizzoni in the same media is inert."

Billroth and Klebs assert that micrococci may grow into rodlets or bacilli, and they with Hallier maintain that microbacteria represent merely a developmental stage in the life history of the micrococcus. These and others, seemingly good authorities, lean to the opinion that pathogenous bacteria are but the non-pathogenous forms developed in infective media,

and would thus seem to consider them as bearers of infective virus in those cases in which they have seemed to induce a diseased process.

Oertel, whose article in Ziemmsen's Encyclopedia accorded to the micrococcus the power to produce this disease, which statement at that time was generally accepted as true by the profession, now admits that the theory that this disease is caused by a bacterium, though plausible, is not proved; and since Klebs, Loefler and Cheyne made the discovery of the bacillus which bears the name of the two former, a more thorough examination has demonstrated this bacillus in non-diphtheritic cases, and even in healthy bodies as well as in diphtheria, one observer of note finding it in twenty-six out of forty-five cases in various conditions of the mouth and throat. In culture and experiment, the bacilli from different sources seemed identical, and Dr. J. Lewis Smith concludes a recent article on the subject by saying, "In the light of recent investigations, the Klebs–Loefler bacillus has no more significance as a cause of diphtheria than the micrococcus of Oertel."

An article in The Universal Medical Journal, Philadelphia, under date of January, 1895, referring to a communication by Dr. Hansemann of the Berlin Medical Society, states: "The author declares the bacillus of Loefler is not the diphtheria bacillus in the clinical sense of the word. It is absent in 30 per cent. of the cases, is always associated with the streptococci and staphylococci, and is absent in certain clearly diphtheritic affections. Its subcutaneous injection into animals provokes only a simple œdema. In the throat of animals it does not cause diphtheria when the mucous membrane is healthy. Animals brought in contact with diphtheritic patients do not contract diphtheria. His conclusion is that the bacillus of Loefler is incapable of producing the diphtheria of Bretonneau."

Says La Tribune Medicale, December 12, 1894, "Behind this article and its author, Dr. Hansemann hides a great German scientific and medical authority, viz: Prof. Virchow."

Of scarlet fever, a disease whose contagion is exceedingly virulent, and one in which the bacteria should be readily found

if the contagion is of that character, Dr. Samnel C. Busey in a late article says: "This disease is due to a contagion of whose nature we are utterly ignorant," and adds, "it appears to be demonstrated that the virus may retain its pathogenetic power after having been deprived of all living micro-organisms." While Richardson believes the disease due to chemical poison. Smallpox, measles and pertussis are found in the same position relative to a microbe, but I think no one doubts their contagious qualities. While enteric fever and malaria seem to present pretty constantly the peculiar forms to which they are attributed, many subjects present these forms without giving expression to these diseases, which would appear to indicate that other agencies are required in their production. In syphilis and chancroid, no specific bacilli have been successfully demonstrated, and in tuberculosis the bacillus of Koch may or may not be found, while it is found in many other affections. Dr. A. Jacobi says, "There are cases which are tuberculosis in everything but the bacillus."

Biedert reports the case of an acute pulmonary tuberculosis in which no bacilli could be found. Ribbert met with small bodies consisting of lymphoid and other cells, giant cells included, without bacilli, which he called "Multiple Lymphomata," solely because of the absence of the bacillus tuberculosis.

Biedert says, "There must be an affection which cannot be distinguished from tuberculosis on any other ground than the absence of this baccillus," and Eberth describes these conditions as pseudo-tuberculosis. While the bacillus tuberculosis has been found in synovitis, ostitis, adenitis, periostitis, pneumonia, nasal and aural catarrh, eczema and elsewhere.

But enough. The bacterial origin of disease is to-day as much a theory as it was the day it was first propounded; while it is attractive, and in many respects plausible, a pretty careful canvass of the subject leads me to make the broad statement, that in no disease known to man, is it fully and completely proven that it is produced by an unaided organism introduced into the body independent of any property acquired by such organism from its nutriment or environment, nor is it proven that any foreign cells have the power to cause the formation of

ptomains in the living body. That this may all be proven sometime may be possible, but until then we are dealing with infective and contagious materials of whose nature we are wholly ignorant and will do well not to blindly follow too far this *ignis fatuus* of the germ theory.

PNEUMONIA.

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I sometimes wonder if, as a profession, we are not becoming slightly crazed upon the subject of bacteriology, and in our hunt for germs, lose sight of our patients and the rational methods of treating the disease. While reading and thinking over the writings of many of our experimenters I have been almost led to believe their brains have become a mass of germs, and for this reason they are not able to see anything, hear anything or think of anything, but germs of infinitesimal size but gigantic names.

Bugs to right of them,
Bugs to left of them,
Bugs in front of them,
And bugs inside of them,

until we are astonished that they are not eaten up "body, soul and breeches instanter."

While accepting the germ theory of disease to a certain extent I am led to believe that it is partly a medical fad or craze and that while much good may come from it in the end it will be after the wild visionary theoretical portion has been sifted out and the practical, scientific and sensible portion left. I am sorry to say it, but I believe there is no profession or class of men more prone to run after and take up new and unproved theories than our profession at the present time. This may be due in part to a former too great conservatism. A pendulum when let loose will swing in an opposite direction far past the perpendicular, so when a too great conservatism has been exercised and is once overcome the opposite extreme is generally reached. The desire to be considered the followers of men having

great names in foreign countries of whom we know little except by their writings, and who launch crude and unproved theories as facts for fear they may be forestalled by some one else, has its influence.

The desire of the dear people is for something new and startling, and they run after the man that takes up every new departure from old and well beaten paths however poor his success in relieving their afflictions. This also has its influence upon many practitioners of medicine, as it is not pleasant to have our patients leave us for the doctor across the way who has the anti-bug medicine and a hyprodermic syringe; particularly when wife and baby need new bonnets or hubby needs tobacco and other luxuries, if the M. D. is of the gentler sex.

I have never had it proven to my satisfaction that pneumonia in any of its forms is a germ disease.

As I presume all are conversant with the preliminary and different manifestations of this disease I shall not mention them. If the investigations of many are to be relied upon—and we do not dispute their statements—germs are found in the sputum and tissues of the lungs in this disease, but, whether the pneumococci are the cause of the disease, or the disease furnishes a soil peculiarly adapted to their growth, is a question not yet satisfactorily settled.

An experimenter finds these pneumococci in the diseased tissues and exclaims, "presto, I have found the exciting cause of the disease." But hold, my friend! Out there by the roadside is a dead carcass full of maggots. Were the maggots the cause of the animal's death, or, did the dead body furnish a fit pabulum upon which they thrive after being deposited by the parent fly?

A piece of soil is turned up to the sun and straightway weeds or trees spring up and grow. Did the weeds or trees develop the peculiar condition of the soil; or the changed condition of the soil permit the seeds to germinate?

These thoughts have been brought out by the statements of some, that pneumonia is a germ disease, and, as such, should be treated or left alone to run its course, which will be either that the germs will destroy themselves in the course of time, or will destroy the patient; and, whichever end is reached, we can

sit back and say it was the will of Providence and could not be helped.

From over twelve years' experience in Colorado in treating such cases of pneumonia as naturally come to a physician with a fair general practice, I have learned not to look upon this disease with as much fear as most practitioners tell me they do. One old practitioner told me he had averaged one death in three cases treated. I promptly told him that if I had not had better success than that I would immediately change my line of treatment.

Experience has taught me that, whether the originating cause of pneumonia is a germ or something else, it is as amendable to treatment as any other disease and, in a large majority of cases, no more fatal than measles. In fact, without complications, I expect recovery as the rule.

In pneumonia, from some cause an irritation is set up in the lung. This causes an increased blood supply, an engorgement, followed by an exudation, consolidation and then either a breaking down of the tissues or resolution.

The Father of the American Medical Association, Prof. N. S. Davis, impressed upon us in his lectures to us as students, the necessity of prompt and efficient remedies in the beginning. "Overwhelm it in the start," was his watch-cry, and such has been my effort while guarding against overwhelming the patient.

Relieve the irritation if possible. If this can not be done relieve the engorgement by opening or relaxing the peripheral circulation and thus diminish the blood supply in the lungs.

In case a stream of water becomes blocked by drift and the surrounding country is threatened with inundation, all the by-streams and ditches, and even the levees are opened, so that the excess of water is drawn off and then the obstruction can be removed.

So in pneumonia to relax the capillary system draw the blood to other parts of the body and the engorged and inflamed lung will be enabled to regain its normal condition. To accomplish this give quinine and Dover's powder. The quinine for its effect upon the peripheral circulation, and the Dover's powder for its anodyne, expectorant and relaxant effect. I give from four

to five grains of the quinine, and from two to two and one-half grains of the Dover's powder every four hours. If the Dover's powder causes slight nausea, somewhat short of emesis, all the better. At the same time, if the fever is high, give acetanilid or aconite and gelsemium in small repeated doses. I much prefer the action of the latter remedies. As soon as the prune-juice expectoration appears, extract of ergot and iodide of potassium is given. The ergot is given for its action on the circulation in the lungs, and the iodide for its alterative action. If there is a tendency to a weak heart action, give ammonia in some of its forms, some alcoholic preparation, strychnine, or some other heart stimulant. From the first I use turpentine with oil, to the chest and back, and envelope the entire thorax in flannel or cotton. I feel better satisfied when enough of the turpentine has been used to impregnate the air of the room with its vapor.

The result of this line of treatment has been so satisfactory with me that I have not felt disposed to leave it for any of the new treatments so lauded by some.

The per oxide of hydrogen has been highly praised by some, but I have never felt satisfied in my mind, of its efficacy alone, and believe I can show cases under my line of treatment when properly followed, equal to the best claimed by the per oxide followers. I shall give report of three cases.

CASE I.—Lumberman, about 35 years of age, lived in an open cabin in the mountains. Was seen one cold night in the early winter. Temperature, 105. Respiration very rapid. Severe pain in the chest. Moist rales over both lungs. Expectoration very profuse, almost pure blood.

I put him on treatment outlined above, and told his friends I did not believe he would recover. Two days later he sent word that the medicines were doing all that could be done, and to send some more. In two weeks he was chopping logs in the woods.

CASE II.—Mrs. L., aged 48, was taken in the evening with severe pain in the left lung, difficulty of breathing, high fever and severe cough. She had not been feeling well for several days. As I was engaged, another physician was called, who gave a hy-

podermic of morphia and applied hot fomentations to the seat of pain. In the morning I found temperature about 105, moist rales over entire left lung, intense pain, and moderately free rusty sputum. Turpentine was applied to the entire chest and back, and absorbent cotton applied, so as to envelope the thorax. I gave the usual remedies, and in thirty-six hours the temperature was normal; expectoration, while free, showed less blood and the pain on coughing, and breathing was very much diminished. From this time on, there was no fever, and by the sixth day, while moist sounds were still present, and some soreness, the blood had entirely disappeared from the expectoration, and on the eighth day she was able to sit up.

CASE III.—A boy, 12 years of age, was taken with a chill and pain in the left lung. Temperature, when first seen, 104. Respiration rapid. There were present all the premonitory symptoms of pneumonia, located about the center of the left lung, covering an area of about three inches in diameter. In a short time prune-juice expectoration began. In twenty-four hours from the time treatment began there was no fever, the pain was almost gone, and in three days, with the exception of some moist rales, no signs of the disease remained.

Many more cases could be reported, but I will not weary you.

Such rapid results are not claimed for all, or even a large part, of cases treated, but it is claimed that the final results and recoveries from the treatment outlined are as good as could possibly be expected; and these cases are given to offset the claims of the believers in the per oxide treatment.

THE IMPORTANCE OF RATIONAL METHODS IN THE DIAGNOSIS OF PHTHISIS WITH SPECIAL REFERENCE TO PRE-TUBERCULOSIS.

CHARLES S. MANLY, A. M., M. D., SOUTH DENVER.

Pre-tuberculosis purely pulmonary (in origin and symptoms).

1.—Inflammation, Infiltration, Proliferation, Consolidation.

Following mechanical injuries to the lungs, e. g.

- Old pneumonia, with crippled air-cells.
- Old pleurisy with effusion remaining unabsorbed.
- Chronic bronchitis, "winter cough."
- Measles.
- Whooping-cough.
- La grippe.
- Irritation from dust or gases.
- Cell lethargy.
- Cell overwork (cornet player or chorister).
- Bad climate—fog and damp.

2.—"Central points of infection," as the demonstrable sequels of recent pulmonary disease or other acute diseases.

- Pleurisy.
- Pneumonia.
- Bronchitis, etc.
- Typhoid fever.
- Scarlet fever.
- Syphilis.
- Diabetes.

Pre-tuberculosis general.

3.—Diathetic disturbances; Functional disorders.

- "The personal equation."
- Phthisical habitus.
- Tendency to destructive metabolism.
- Inherent in the physique.
- Syphilis.
- Scrofula.
- Tendency to glandular swellings.
- Lack of diathetic tendencies antagonistic to disease.

The tendency to tuberculosis as incident to mechanical injury to the lung, as in "1," and like tendencies grafted into the convalescence from other acute diseases, as in "2," are well recognized and scarcely need repetition. That tuberculosis of the lung must be feared after a pleurisy or pneumonia, or in an occupation like cutlery-grinding, is denied by few. These are actual pre-tubercular conditions recognized by physical diagnosis.

The true pre-tubercular condition, however, is a condition not so easily detected, evading, as it does, all auscultatory search. Our organs of special sense, aided by the instruments of precision in diagnosis, are of much value in the study of pre-tuberculosis, purely pulmonary, but not in the general pre-tuberculosis.

"The absence of reliable signs of the earliest stages of tubercular deposit can not be too forcibly impressed upon the young practitioner, who, with commendable zeal, is too apt to think and prone to hope that by sufficient diligence, experience and care, he may be certain that no tubercle shall escape his searching examination. This is the great disappointment which every one has to encounter, who studies and practices physical diagnosis. That upon which he had set his heart, to detect the first shadow of consumption scarce yet resting on a life, before it is too late to drive it back, is the very dream which experience is sure to dissipate."

It is right here that we learn the difference between physical signs and rational signs. One writer has expressed himself regarding the "phthisical habitus" by the statement, "I esteem rational symptoms as of greater weight than those signs elicited by auscultation."

These are the conditions which make up the difference between a strong man—proof against infection—and those who have the "tuberculous pre-disposition"—"phthisical habitus," "favorable soil," "tubercular diathesis."

These conditions constitute the "personal equation"—an inherent individual tendency to destructive processes—a diathetic tendency which makes infection possible and determines the course and character of that infection. "That condition

which makes the human tissues a receptive soil—a favorable 'culture medium' for the tubercle bacillus—that condition which of old was called 'diathesis' and now 'susceptibility' is itself a disease—a departure from the *normal*—and I believe it to be the most important element in the morbid complexus termed tuberculosis. It is the element requiring the greatest care in prophlaxis—the most intelligent and faithful treatment."—*S. Solis Cohen.*

This "personal equation," or lack of normal resisting power, is not an organic condition recognizable by physical signs, but a *functional* change detected only by rational methods.

True tuberculosis then starts with a wasting—an impoverished nutrition being to blame—a condition of sub-oxidation and physiological starvation—and "intoxication" resultant, perhaps, upon, or assisted by, the poisons left in the system from sub-oxidized foods. With this follows perhaps a long train of gastric troubles—a "gastric depression" or "gastric exhaustion," as I have termed the conditions—due, no doubt, to dilatation of the stomach and fermentation processes.

Your patient then begins to complain of malaise—says he is "dead on his feet," "sawed off in the legs," "lead legs" (or numbness). At about 11 o'clock A. M. he is tired out, feels better after lunch and is "dead tired" at 4 P. M. and wants to rest himself by sitting or lying down. A variable appetite, some shortness of breath on climbing stairs, a heart action increased in rapidity, are the next symptoms. However, a few weeks at the sea-shore or mountains, or an out-door life will remove these disagreeable symptoms, and he returns with elastic step and feet no longer leaden. This is your pre-tuberculosis. I do not say that such a train of symptoms would warrant you in telling your patient he was in the incipiency of tuberculosis, but I would have you remember that these symptoms are cardinal indications of the pre-tubercular stage. He certainly is not the victim of any acute disease, and will most probably be told that he is suffering from typhoid—"walking typhoid"—yet, when these symptoms return and continue for months, you must eliminate all other diseases by exclusion. Many such

pre-tubercular cases now develop febrile symptoms, yet are unconscious of the fact. This I have seen in patients who had a temperature of 100 or 101. This afternoon hectic is preceded, not necessarily by a *chill*, but by a creepiness between the shoulder blades and flashes of cold, commonly described as shivers.

The presence of hectic flush on the cheek, the "burning in the eyeballs," the heated breath—betoken the fever which leaves the patient with "aching bones" and that characteristic exhaustion.

Conclusions:

1.—Auscultation is not diagnosis. In a large, *spongy* organ like the lung, it is almost impossible for the most expert to diagnose by physical methods, deep-seated changes in that tissue.

2.—There is a condition of pre-tuberculosis preceding organic change in the lungs, recognized only by due consideration of the rational symptoms.

3.—Family history, heredity, personal history, are of great weight, and a diagnosis of the pre-tubercular state must often be made, *even when it is found on examination that the patient's lungs are "as sound as a dollar."*

4.—The "personal equation" will be determined by reference to "1," "2," and "3."

5.—Defective nutrition (evidenced by anæmia, gastric disorder and loss of weight) is the key-note of this condition.

6.—Suspect all "wasting" diseases to have a tubercular origin and tendency. Loss of weight, vigor, appetite, will incline you to suspect tuberculosis first of all diseases.

ANTIPHTHISINE.

Report on Prof. Klebs' New Tuberculin Derivative, and Some of the Cases Treated.

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What I know about antiphthisine I have learned since the middle of last December; and I have to thank Dr. Edwin Klebs, the author of it, and Dr. Carl von Ruck, of Asheville, N. C., for

many courtesies received, which enable me to make a pretty fair showing for the remedy. Yet I cannot consider the remedy as absolutely perfect, nor the technique of its administration as unquestionably determined. One ought to have a longer time of observation, a larger series of cases from which to draw conclusions, before presenting a conclusive report. Therefore, please consider this as preliminary to a finished report.

Antiphthisine is very much like tuberculocidin (Klebs), though differently prepared. Instead of being made from tuberculin, it is made directly from the ten-times concentrated culture-fluid of tubercle bacilli, the toxic principles which tuberculin contains being supposedly excluded. It is thus claimed to represent the soz-albumen -the probable germicidal property in tuberculin -as much as exists in an equal quantity of tuberculin; and its special value depends upon the fact that a larger dosage is allowable without the injurious toxic effects to be expected from large doses of tuberculin.

According to Professor Klebs, the separation of tuberculin (representing the tubercle bacillus, culture-fluids and ripe cultures,) into its distinct constituents gives:

"(*a*) *A Tex-albumen*, precipitated by sodic iodide of bismuth.

"*Physiological effects*, fever, malaise, headache, general aching, nausea, diarrhœa, lung congestion, cough.

"*Therapeutic effects in small doses*, stimulant to tubercular tissues.

"(*b*) *Alkaloids*, soluble in alcohol.

"*Physiological effects*, depression of heart and circulation, diminished arterial pressure, capillary thrombosis, hæmorrhagic effusions in parenchymatous organs.

"(*c*) *A soz-albumen* (Antiphthisine).

"*Physiological effects* None in doses up to 10 C.C.; destroys tubercle bacilli in the test-glasses.

"*Therapeutic effects in animal experiments*, confers a slight degree of immunity to tubercular infection. Causes resorption of tubercular tissue, and conversion of such to the form of tissues from which it proliferated. Obtains the complete cure of guinea-pig tuberculosis in the human subject. Tubercle bacilli

degenerate and disappear, tubercular infiltrations are resolved, and the consolidations clear up. Fever is diminished or disappears, owing to destruction of bacilli and resorption of tubercular tissue. Secondary fever may occur, however, from its effects upon tubercular lesions."

"(*d*) *An albuminoid substance*, obtained from the bodies of the tubercle bacilli.

"*Physiological effects in animals*, confers immunity to a much greater degree than does raw tuberculin.

"*Therapeutic effects*, not fully determined, and now the subject of experiment. In the healthy human being, harmless in doses up to 3 C.C. Not yet tried in tuberculosis."

This, to my mind, is the most lucid description yet given of the ingredients of tuberculin or the combined substances of which it is made. And the separation of the soz-albumen, if accomplished as Professor Klebs claims, entitles him to great credit from us all; for many of my own cases seem to furnish a verification of his statement that the major part of the germicidal influence of tuberculin resides in this soz-albumen or antiphthisine.

When, last December, I was asked to give the remedy a thorough trial, I was requested by Professor Klebs, "that you will not try the remedy except in cases of pure tuberculosis, and exclude from the treatment, for the present, cases of mixed infection, and septic cases, and, of course, all such as have amyloid, or are so far reduced physically that they necessarily must die of the complications or exhaustion already present."

In regard to such exclusion I must explain that it is very hard to make it work. For instance, there are very few cases which come to a health resort, like Colorado, in whom there is not some *mixed infection*. Therefore, as my object has been to help my patients, more than to prove the uniform efficacy of the remedy, I have followed my natural inclination to give some almost hopeless invalids a chance. I conceive that the best test of a remedy is not that it will work well (as is claimed for all so-called cures, climatic or otherwise) in incipient non-febrile cases, or as usually erroneously stated, "in the first stages." but the proper test is that it has some specific effect upon the disease

as we most often find it; and that is *after there has been more or less breaking down of lung tissue.* Climate, with right living, may take care of these other cases, but we need a remedy which without injury to a far-gone consumptive will give him, on the lines of more or less permanent immunity to tuberculosis, the benefit of his ten to thirty per cent chance of arresting his disease, if, in fact, that slim chance is his. I believe that somewhere, within the range of the remedies here discussed, that boon resides, if we can only get at it, and anti-phthisine seems to be the nearest approach to it yet proposed.

It may here be asked, how about "the anti-tubercle serum" treatment lately introduced by Dr. Paul Paquin, of St. Louis? I have not investigated that method sufficiently to endorse it as proven; but I was present at a late meeting of the American Medical Association when Dr. Paquin presented three patients treated with his horse serum, and, after the reading of his paper, I invited him, as well as Dr. von Ruck, to my hotel, where, for about two hours, we examined these cases and their histories. Dr. von Ruck was inclined to believe the good effects noted, were due to a transmitted "tuberculin effect," but I could make nothing satisfactory out of them, because there was nothing corresponding with my own usual examination with which to make comparison. The original examinations and histories had been made by different internes in the hospital and essential points were not noted and classified. For instance, there had been no attempt even, to determine the daily fever range and its change under treatment. However, admitting a favorable condition of arrest perhaps, there was no positive cure in any of these cases, for both Dr. von Ruck and I found infiltrations in all and the evidence of softening (in progress or recent) in one. How much of the good effect was to be attributed to the horse serum alone, and how much to the supposed immunizing of it, was impossible to tell.

Last year I experimented myself somewhat with dog serum, the healthy puppy having been thoroughly treated previously with tuberculin, but I could get no certain good effect in addition to that of the tuberculin thus transmitted through the dog's blood. Afterwards I inferred from evidence in Sternberg's

Bacteriology that such an experiment as I had tried must give an uncertain result, for toxic germs sent through the circulation of an animal are variously affected according to that animal's resistance or other conditions. In fact we learn from the same authority, that attenuated cultures of some germs may be re-established, as to virulency, by this procedure. Probably the immunity effect is an anti-toxine influence created in the blood of the living subject operated upon.

As to the use of the serum from dogs, previously treated with tuberculin or the culture fluids of tubercle bacilli, I have lately learned that these experiments have also been tried in Germany, and no decided results were obtained. This is one of the interesting phases of this important subject which we have to acknowledge is still in a formative, undetermined stage.

To return to the consideration of antiphthisine, let us discuss its action in connection with the study of two or three cases selected from the twenty-three I have thus far had under treatment.

November 12, 1894.

CASE I.—C. R., college student, age 22, from Terre Haute, Ind., height 6 feet, no inheritance to tuberculosis, though not of strong constitution; was in college the year '90 and '91, but had to leave because of poor health. A year ago was treated for catarrh. Last summer and spring had a cough and yellow expectoration. Six weeks ago had pains in left chest, though not sick in bed. Yellow expectoration for a month, less now. Tubercle bacilli were found in his sputum a month ago. Arrived in Colorado three days ago, and felt some slight chest pains at this altitude, Weight in health, 165; now, 155 pounds. General condition, fair; pulse, 90; respiration, 20; temperature, normal; spirometrical record, 150 cu. in., three-fourths of what it ought to be, and manometer record 65 m. m., chest expansion, 33 and 34¾ in. Right side about two-thirds, and left one-fourth in., measured separately. Physical examination: dullness at both apices, front and rear, chiefly left, with a dilatation of left main bronchus and broncho-vesicular respiration around this, also some of same sound and exaggerated whisper inner

part of right mammary region. Dullness decided and pleuritic friction base of left, especially rear.

Diagnosis: Broncho-fibro-tuberculosis with pleurisy. Treatment: A blood alterative, (syr. hydriodic acid), the "Inhaler and Exhaler," and he to go to McCoy's over in the mountains.

April 3, '95.—Been at McCoy's. Caught cold and was ill for two weeks last of February with pleurisy, etc. Then picked up; weight now 166 pounds. Looks better; coughs and raises very little. Dyspnoea less. Spirometrical record 155 cu. in., and manometer, 85 m. m. Pulse, 92; respiration, 22; and temperature, 99¼° Fahr. at 3 o'clock p. m. Expansion, 33 and 36½; a decided gain on both sides. But there is a shrunken spot below the left clavicle and almost "cracked metal" there; the broncho-vesicular respiration before noted remains. The lower left lobe has opened up somewhat, but there are mucous rales in infra-scapular region, increased on coughing, and twenty bacilli to the field are found. He has been climbing hills and taking good care of himself, yet the lung is simply opened up and tuberculosis is not eliminated. Recommend additional treatment by antiphthisine. This was commenced in about a week, and the following is the record:

April 25.—Reached nearly three c. c. antiphthisine to-day by the rectal method—no great reactions. Physical signs are better. Bacilli only four to field after treatment for nine days.

May 3.—Reached over four c. c. antiphthisine; no bacilli to field now. Semblance of cavity under left clavicle much less, lung is clearer, and the mucous rales on coughing are heard lower down in the rear of left lung. Weight, 162 pounds; looks well; can play tennis two hours a day.

May 24.—At longer intervals worked up to over five c. c. antiphthisine for the last dose to-day. Has continued to improve, and now there is no expectoration whatever. Looks and feels better. Pulse, 72; respiration, 18; and temperature, normal. Spirometrical record, 160 cu. in.; manometer, 85 m. m. Physical examination shows decided improvement. Positively no cracked metal left apex front. Lung has cleared up nicely and the mucous rales on coughing at base of left are not so

marked, and the patient is here to verify by his good appearance his improved condition.

If we had wished for a test case for the trial of anti-phthisine we could not have done better, I judge, than to have chosen this gentleman who, if he had any "mixed infection," had eliminated the same in the mountains, and who evidently had no concealed tubercular degenerations in out-of-the-way lung spaces, undoubtedly the bane of many doubtful or poorly understood cases. The specific could only reach the scource of tuberculosis *in living tissues*, and that, we must remember is as far as it should be expected to reach. There being nothing further to be eliminated, and an excellent vital resistance to aid this process, the good result is easily explained, especially to one who has other evidences of the germicidal influence of anti-phthisine. We do not now know how much of immunity accompanies this germicidal effect, or how it is associated with it, but it is reasonable to believe that there is something of this nature in anti-phthisine, which, according to my experience, is a decided property in crude tuberculin.

I have chosen the foregoing case to show how nicely the new remedy works in pure tuberculosis, even admitting the great aid of the climate and exercise.

I choose the next case to show that a like, though not as great, a care is needed in the administration of this soz-albumen as in giving the crude tuberculin considered as a tox-albumen; in other words, to show not only that every patient should be individualized, but that the effects of these remedial agents vary in different individuals, and that the amount of organic matter, even though it is weighed and definite, admitted to be in antiphthisine, is enough to give decided systemic and febrile reactions in certain cases. This is contrary to the announcement of the new remedy, but this only militates against its use in treatment to the extent that it is not yet a means to be universally given out to every one who takes a notion to try it. Without the precautions the inventor of it is taking in this regard, there is danger enough that, through ignorant and ill-advised use, much of the odium which befell tuberculin would attach itself to antiphthisine also.

February 21, 1895.

CASE II.- Mr. A. C. C., age 40; from New York State; in the commission business; married; height 5 feet 11½ inches; no inheritance; previous to present sickness, health good, though he is of a very nervous temperament, and has been much worried about business. Have never seen any one so alarmed and discouraged because bacilli were found in his sputum, as had been done by Dr. Lobingier in this case before he consulted me.

The history is, that in June, 1894, he received some hurt in his chest, followed by a cough during July, which became worse in August, and by the end of August he was expectorating yellow matter, and having some night-sweats. In November he caught cold, and this was followed by profuse expectoration, though he was not at any time sick in bed. Took considerable whisky and milk, and did not lose weight. Weight now 155. Arrived in Colorado January 7, 1895, not much appreciating the altitude. Sputum straw-colored, less than a drachm a day. Pulse, 88; respiration, 16; temperature, normal (A. M.); spirometrical record, 220 cu. in.; manometer, 50 m.m.; expansion, 32½ and 35½ in.; movement, left ½ in. less than right side.

Physical examination: Dulness at both apices, especially in left infra-clavicular region, below which, and in left mammary region, there is broncho-vesicular respiration, and some "cog-wheel" breathing. This place under left clavicle proved to be a concealed tubercular infiltration-spot, which cleared out, and became a small, dry cavity under the treatment which followed.

February 26, 1895. Commenced the treatment by antiphthisine, hypodermically. By the time I had increased to 1 c.c., there was the distinct reaction-sound, similar to the healing-sound from tuberculin, in the left infra-clavicular region, following less marked reaction-sounds (in response to smaller doses) below and to the right of this spot, also in the axillary and interscapular regions. There were also temperature-rises and general reaction results in response to 1¼, 1½ and to the 2-c.c. doses, till, finally, his extreme susceptibility was overcome by the tolerance created to the remedy. This was, during the last

of the treatment, much aided by recourse to the rectal method of administration. The record of this case goes on to state:

May 3.—The left lung has much cleared up. The small cavity is clear and seems to have moved up underneath the clavicle and the cog-wheel respiration below has disappeared. Have had to progress very cautiously with the treatment.

May 18.—Has reached 3 c. c. antiphthisine. Weight now 150 pounds, and he looks and *is* much better. The breath sounds are good and dry—a few bronchial (?) rales in the left inter-spinatus region on coughing, not constant, however. The cavity in the top of left lung has shrunken to a smaller spot underneath the center of the clavicle, and the breathing is nearly normal over the rest of this lung.

After this, the improved condition continued till the last of May, when the patient was (temporarily) discharged to go East and bring his family out to Colorado to reside. The bacilli which had been one to four to the field in March, become "involuted" as is usual under this treatment, in April and not easily found, and in four microscopical examinations made after April 25 up to May 25, none were found.

I believe this case is in a much better condition than that of mere "arrest." There is certainly an assurance of health in the cleared up condition of his lung, the improved state of his feelings and general health, which bespeak a degree of immunity which it is hoped will last him for sometime.

The unusual local febrile and systemic re-actions to antiphthisine shown in this case are to be attributed to the fact perhaps that the concealed condition of the tubercular spot in the top of the left lung kept up a toxic state of his blood which, in one of his extreme nervous state, made him specially susceptible to the anti-toxine effect produced by the organic substance the antiphthisine undoubtedly contained. The same effects, though much less in degree, have been variously met with in other causes, when the treatment was pushed too rapidly, yet no bad effects have resulted therefrom. It only goes to show that when this remedy is made perfect, and the technique of its administration better determined, we should have a specific well calculated to combat tuberculosis pure and simple. To

explain the temperature rise, etc., Prof. Klebs wishes me to add that the fever results from the liberation of toxines within the organism, by the degeneration of the tubercle bacilli, and the resorption of the tubercular tissue. The basis for this belief rests upon conclusions stated by Dr. von Ruck as follows:

"The etiological treatment of diseases caused by pathegenic micro organisms, has for its foundation, the fact, that specific disease germs produce substances within the infected living organisms, and also in their own culture fluids, which are inimical to their own life conditions, and that infectious diseases thus become self-limited and cultures die out before the nutrient substances are exhausted, on account of the poisoning and destruction of the disease germs themselves by their own secretions or vegetation products." It is claimed that this specific is in this antiphthisine and that this is proved by the self-limitation of the living cultures, and by "the destruction of the virulency of the tubercle bacillus by treating it with antiphthisine. outside of the living organisms."

Experimentally, the germicidal and healing effect of antiphthisine seems to have been shown in most of the cases I have had under its influence, *i. e.*, in the lessening of the number of germs to the field found, and their degenerative or incomplete forms thrown off when good-sized doses were reached, as well as in the clearing up of consolidated or infiltrated tubercular lung tissues.

Therefore, while I cannot support the claim that antiphthisine is wholly without reaction effects, and we do not yet feel quite sure of its exact constituents and their constancy; while I must differ with Dr. von Ruck in my impression that some toxines, rather than "no toxines," remain, and while I think Professor Klebs is in error in placing the dose the same per rectum as when given hypodermically, when it should be much less by the latter method, yet I am glad to recognize this great advance in specific medication. This work is certainly in the right direction, and a possibility is thereby afforded us of hastening recovery through the proper method – the increase of natural resistance to tuberculosis, and thus hope is possible for some otherwise incurable cases.

As to this question of toxines, it has seemed to me that Nature may have some selective power in absorbing some and not other ingredients of remedy when given by the rectal method, and hence that method is to be preferred in very susceptible persons, highly charged with the tubercular virus. In this belief Professor Klebs seems to agree, for he writes me: "We know through the labors of Brieger that the resorption of toxines is much slower than of other albumeses."

It has seemed to me that there is a stimulating effect due to antiphthisine, and that produces an increased leucocytosis. It has lately occurred to me that a limit to the good which antiphthisine may accomplish in a given case might, perhaps, be assumed to have been temporarily reached when that wonderful process is found to be overtaxed, or to have been arrested, as shown by the paucity of leucocytes, and those swollen or granular, when demonstrated by microscopic examination with high-power lenses. If this supposition is correct, it may be a greater success still is in store for us by combining or alternating with the use of antiphthisine, or a similar tubercular product, something else, to be found, which will foster or increase this fascinating leucocytosis. A case lately investigated has impressed this expectation upon my mind.

I would have liked to have shown the helpful and encouraging results of antiphthisine used in some of the advanced third or excavation cases I have been working with, but the time-limits for this paper have already been reached, and I must content myself with the general statement that under this new treatment a certain degree of immunity and prolongation of life is possible, to be added to that which this climate here offers to a properly selected proportion of even these fated invalids.

SYMPOSIUM:

THE EXTINCTION OF COMMUNICABLE DISEASES.

INTRODUCTION TO SYMPOSIUM.

WILLIAM P. MUNN, M. D., DENVER, COLO.

When three years ago the sanitary authorities on our seaboard cities were successful in the effort that they made to turn back the invasion of Asiatic cholera on our shores, and when the sanitary authorities of the united municipalities of Germany and France and of Great Britain were successful in driving out from their borders this disease which had already been established among them, they set a mark for future attainment by sanitary authorities throughout the world. They seem to have demonstrated that under existing conditions it is possible by the exercise of certain regulations to extinguish at least this one communicable disease, Asiatic cholera.

When the entire civilized world adopted the practice of vaccination, as proposed by Jenner, and has carried it out for a century with such success that at the end of that time an epidemic of smallpox is considered to be a disgrace to any community, considered to be an occurrence which is reprehensible to the administration of the sanitary authorities of that district, that experience seems to prove that it is possible to eradicate this one disease,—small-pox. It seems to us, that we are justified in asking the question: Can all communicable diseases be extinguished? If we have not yet reached the point, are we rapidly approaching the time when the universal application of the knowledge, now in our possession, will enable us to put a stop to the ravages of tuberculosis, to assure the world that mothers need not longer tremble at the mention of the name of diphtheria, or of scarlet fever; to assure the world that surgical infective diseases have come to an end, and that operative interference need not longer be avoided because of the dread of blood poisoning.

For the elucidation of this subject, and for some consideration of it in detail, we have thought proper to have this sympo-

sium this afternoon, and to enter more or less fully into the discussion of the separate diseases. Is tuberculosis to be established and acquired in Colorado, or can we render such an occurrence impossible? Is diphtheria doomed? Are the public schools forever to continue to spread scarlet fever among the children of all communities? Are surgical infective diseases to be put an end to? I beg for your earnest attention and co-operation in the discussion of these subjects.

THE GENERAL BACTERIOLOGIC STATUS.

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It will not be necessary for me, I think, to offer any arguments to prove that infectious diseases are caused by the invasion of micro-organisms. In many of the infectious diseases we already know with sufficient exactness the specific germ, and have gradually become acquainted with the biological facts pertaining to it, which explain the various phenomena associated with the disease. In other diseases we predicate with equal certainty the existence of such causes, although our methods have as yet been insufficient to discover them. Admitting then, that the primary cause of infectious diseases is some form of micro-organism, we must, nevertheless, bear in mind that the germ is not the disease, but that the changes brought about in the organism, its reaction, its endeavor to repel the invasion, the degree of success with which it conducts the defense, constitute the disease in its clinical manifestation. Continued investigations have brought to light facts indicating the nature of the process, which seems to be essentially chemical, but of a complexity almost too great for our present methods. Moreover, it seems to be settled now beyond dispute that we may take advantage of these processes in the bodies of animals artificially subjected to disease, to obtain in that way antidotes to the poisons of the disease-germs, for the protection from the attack, and even for the cure of the disease.

In the study of the action of the human organism as opposed to the disease-germ, we have likewise come to recognize

facts, which accord with clinical experience, and apparently in contradiction to the theory of the bacterial origin, were at first dogmatically denied, but which, in the light of our fuller knowledge, now seem the necessary postulate of that theory.

Simple exposure to contagion is not sufficient to produce disease. In addition to the seed, a suitable soil is requisite. In other words, a predisposition, a condition in which the mechanism of defense on the part of the organism is weakened, is usually a necessary preliminary. From this point of view, it may be of as great value for the prevention of infectious disease to strengthen the defense as the avoid the attack. The experience of England with cholera, which proved that proper sanitary conditions were more efficacious than quarantine in preventing the invasion of the disease, is an illustration of this. Indeed, in some of the infectious diseases, our only defense may be, for the present, restricted to this aspect.

To continue, however, the suggestions which a recognition of the necessity of a predisposition for the establishment of the disease, have put into our hands, we may recur to the important fact, ascertained by recent investigations, that virulent germs of specific diseases are sometimes found in or about persons apparently in good health, who have been exposed to the disease. The defense of the human organism against the germ is so complete that, although the latter may, for a shorter or a longer time, maintain its existence, the former is either completely immune to the poison, or answers with only a slight, unnoticed local reaction. The important bearing of this fact on the spread of disease is obvious, and undoubtedly offers an explanation of cases which have hitherto seemed so enigmatical. I may illustrate this with an instance taken from a recent number of the D. Med. Woch. There occurred a severe case of diphtheria in the barracks of a cavalry regiment in Cristiania, Sweden. The case was removed to the hospital for infectious disease, the room and clothing and effects of the patient were disinfected with the utmost care. In spite of this, new cases occurred. The soldiers were then removed to different quarters, supplied with new clothes, the old rooms disinfected and painted. Nevertheless, new cases continued to arise. At this juncture it was

determined to examine the throats of all the soldiers of the company. Cultures were made in the manner which we employ at the Health Department in this city, from the throats of eighty-nine persons, and in seventeen diphtheria bacilli were found. These were immediately isolated. One of them developed a severe attack, two or three others a tonsilitis; the remainder were apparently in perfect health, except that their throats showed a slight inflammation. The interesting part, however, is that the epidemic of diphtheria promptly ceased. Inasmuch as the diphtheria bacillus is known often to exist a long time in the throats of children who have apparently recovered entirely from the disease, it seems evident that apparently well persons may, nevertheless, be a source of infection, and it may be desirable in the future to examine not only the throats of the patients, but of the other members of the household, with reference to the matter of quarantine.

In the few minutes at my disposal I can allude very briefly to certain points of a large subject. It must be borne in mind that we do not as yet know the germ of various infectious diseases. Reviewing the subject, we may name as those diseases in which we can with sufficient positiveness attribute the cause to a specific micro-organism, the following: Tuberculosis, leprosy, influenza (grippe), anthrax, glanders, actinomycosis, diphtheria, tetanus, recurrent fever, cholera, gonorrhœa, erysipelas. Further, suppuration we know to be caused most frequently by the streptococcus and staphylococcus. Pneumonia is like-wise most frequently associated with the diplococcus lanceolatus, which same micro-organism is often undoubtedly the cause of cerebro-spinal meningitis and of endocarditis. These micro-organisms all belong to the group of bacteria. Quite a different organism is the plasmodium of malaria, which seems to belong to the protozoa, the lowest form of animal life. We may possibly associate with this the amoeba coli, which apparently is the cause of certain forms of dysentery. That the future may add to this list, seems more than probable, although the attempt to explain certain appearances observed in malignant tumors as belonging to this class of parasites, is not to be regarded yet as entirely successful. Even more doubtful is the

signification of Buttersacks' filaments as the micro-organism of small-pox, and the same may be said of the bacillus of syphilis. We are obliged, then, to admit our ignorance in the case of certain communicable diseases, and this category includes such common diseases as small-pox, the measles and scarlet fever, for, undoubtedly, the micrococci found in the latter disease represent only a secondary infection. We are very much handicapped in our study of these diseases by the fact that they are not communicable to animals. It certainly is a subject of regret that, so far, the attempts to discover the causes have been unsuccessful, for the hope to accomplish here what we are apparently realizing in diphtheria in the way of prevention and cure, meets with a mighty obstacle.

It is difficult in a short paper to choose from the vast collection of information points which may be of interest. I am tempted, however, to refer briefly to one point which certainly has a bearing on the question of communicable diseases, and that is the much-discussed subject of their arising *de novo*. By this I understand, not the origin of something out of nothing, or of life out of inorganic matter, but the possibility that some of our pathogenic germs may represent only variations of organisms existing independently and diffused in nature, and that these variations may under certain circumstances occur, and thus originate disease. That, in the overwhelming majority of cases, the micro-organism of a disease is derived solely from a previous case of that disease, is beyond doubt. But there are some facts which incline one to believe that the other possibility may not be so categorically dismissed as in the past. We certainly know very little of the ancestry of the pathogenic bacteria. Taking even such an undoubted parasite as the tubercle bacillus, recent study has discovered interesting morphological peculiarities, which, apart from Dixon's earlier and forgotten discovery, had not been suspected. Fischel, and more lately Coppen-Jones, believe that they have found branched forms and indications that the bacillus belongs really to a different and higher class of polymorphic organisms, and Fischel particularly discovered that vegetable media were even more adapted to its growth than the usual media of animal origin.

Some investigators suggest a resemblance or even a close connection—I must confess on what seems to me insufficient grounds—with the ray fungus. The suggestion, however, is that the tubercle bacillus in a different form may, as a bare possibility, have an independent, non-parasitic existence. In a similar way Carl Fraenkel, in a recent number of the Hyg. Rundschau, calls attention to the occurrence of branched forms of the diphtheria bacillus, a fact I had myself observed in one or two cultures that had come under my observation this last winter and which a different method of staining from that ordinarily employed had brought out more clearly. Again, the close resemblance of certain forms of the colon bacillus to the typhoid bacillus, and the difficulty amounting well-nigh to impossibility to always distinguish between them have, as is known, caused many competent authorities to assume that the latter may be only a modified form of the former, and although laboratory experiments have not entirely succeeded in converting the one into the other, it has at least, not been proved to be impossible. Certainly, to those who have seen cases of typhoid fever occurring in the mountains, in places isolated from the rest of the world so completely as to make infection from other cases seem absolutely impossible, the temptation to assume such an origin for the typhoid bacillus is very great; and the frequency of typhoid fever in these very sparsely inhabited districts where the opportunities for infection are so rare, as compared with the lessened frequency in other localities where seemingly the opportunities for infection are so much greater, tends to turn one's speculations still more in that direction. At least, it is a problem challenging further investigation. That there are numerous other problems of a similar nature, is equally clear to even the most casual observation, and the importance of bacteriological investigation in the prevention of communicable diseases certainly needs no further emphasis.

SUMMARY OF CASES OF TUBERCULOSIS DEVELOPED IN COLORADO.

Number.	Sex.	Age when first seen.	Occupation.	Years residence in Colorado.	Place where disease developed.	Duration of disease.	Married (M.) Single (S).	Type of disease.	Sputum examined (e.) b. found. (f.)	Result of disease. (d.) death.	Autopsy (a)	Remarks.
1	Male	67	Merchant tailor	15	Denver	6 mo.	M	Pulmonary	s	d		Several years occa-'ly had brochitis.
2	Male	49	Lapidary, etc.	12	Denver	1 mo.		Pulmonary	s			Father's Fmly g'd.
3	Male	43	Miner	8	Summit Co.	1 yr.	S	Pulmonary	s	d		No hist'y of inf'c'n Liv'd 8 y'rs, hi. alt
4	Male	41	Clerk	13	Denver	1 yr.	S	Pulmonary		d		
5	Male	40	Miner	23	Central City	14 mo.		Pulmonary	s	d	a	Had long lived at high altitude.
6	Female	40	Housewife and dental student	2	Denver	3 mo.	M	Pulmonary				Daughter dying of tuberculosis.
7	Male	33	Pullman porter	6	Denver	1½ yr.		Pulm'y & lary	s	d		Negro. Pr'aps contracted out of City
8	Male	33	Army surgeon	1	Fort Logan	10 mo.	M	Pulmonary	s			H'lthy when came 20 lbs. lost; cir. p'r
9	Female	33	At home	8mo.	Denver and Montclair	2 mo.	S	Pulmonary	s			Nursed sister who died of tuberc.
10	Male	33	Ranchman	12	Near Montrose	4 yr.		Pulm'y, kidney bladder infe'td	s	d	a	Patient Dr. Rogers St. Luke's.
11	Female	32	Housewife and shirt fa'y hand	7	Denver	7 mo.	M	Pulmonary				Mother, fail'd aft'r last conf., Co. Hos.
12	Female	30	Housewife	20–30	nr Castle Rock	3 yr.	M	General tubrc.		d	a	Infec. suppo'd fr'm blad'r aft'r confi't.
13	Male	30	Miner	9	Central	3 yr.		Pulmonary	s	d		County Hospital.
14	Male	29	Laborer	7	Near Littleton	1 yr.		Pulmonary				County Hospital.
15	Male	28	Shoemaker	8 mo.	Denver	6 mo.	M	Pulmonary	s	d		County Hospital.
16	Female	27	Co. Hos. nurse	5	Denver	8 mo.	S	Pulmonary	s			
17	Female	25	Chambermaid	2	Denver	9 mo.	M	Pulmonary		d		County Hospital.
18	Male	22	Laborer	5	Leadville	1 yr.		Pulmonary		d	a	
19	Female	22	Housewife	22	Colo. Springs	10 mo.		Tub'us kidney In'd. Pul apex	Operat	d & re	covered	White swelling of knee at 9 yrs.
20	Male	27	Ranchman	10	Near Denver	2 mo.		Meningeal (?) and pulmona'y		d		Of'n del'r'us while in Coun'y Hospit'l
21	Male	4		4 days	Denver	7 days	S	Tubercular meningitis		d	a	

ON TUBERCULOSIS CONTRACTED IN COLORADO.

HENRY SEWALL, PH. D., M. D., DENVER, COLO.

At the annual meeting of this society held in 1886, nine years ago, Dr. F. A. Lee,* of Fort Collins, read a paper entitled, "Is Consumption Indigenous to Colorado?" In collecting data for calculation, Lee addressed personal letters to 110 physicians throughout the state and received 80 replies conveying the information as to the number of cases of consumption originating in Colorado which had come under the observation of the respective correspondents within two years from the date of waiting. A total of fourteen such cases were reported, five of them being noted by a single Denver physician. Based on these results, the author makes an estimate of the death-rate from consumption contracted in Colorado, compared with the rate known to obtain throughout the country at large, the result being immensely in favor of Colorado. In 1892, Dr. C. F. Gardiner,† published the results of his investigation into the number of cases of consumption which had been contracted in Colorado Springs within a period of fifteen years. He was able to report but ten such cases, and he estimates that the mortality from phthisis contracted in Colorado Springs is only 0.13 per 1,000 per annum, as against 3 per 1,000 in most cities and towns.

In this communication I propose to make no assumption, however justifiable, as to the etiology of consumption, but will merely note some known conditions of its spread, on the one hand, and of its arrest, or cure, on the other. I will assume as proved, in the experience of thousands of sick people who have made this their adopted State, not to speak of the many who are within these walls, that Colorado offers a climate marvelously adapted to the arrest or cure, of most forms of pulmonary tuberculosis in the early stage, and that already hundreds of lives have been preserved to long usefulness which otherwise would have been cut off at an early day. It is proposed to seek

*Transactions Colorado State Medical Society, 1886, p. 16.
†American Journal of Medical Science, 1892.

answers to the following questions: First, Is the disease, consumption or tuberculosis, ever contracted in Colorado? Second. If so, what are the conditions of environment, etc., under which it arises? Third, Is there reason to believe that the proportion of cases here originating is increasing? Fourth, What is the prognosis of cases occurring here as compared with those which are imported? It is manifestly impossible to prove, in any instance, that a person has actually been here inoculated with tuberculosis, rather, than that the tubercular virus has simply developed, after lying a longer or shorter time latent. The observations of Loomis, who found tubercle bacilli in the bronchial glands of a large proportion of healthy people dying by violence, leads to the thought that the consumptive virus may lie latent in the living body for an indefinite period, and develop only under favorable conditions. For practical purposes, it is proper to assume that, when consumption is developed in persons who were healthy when they came to the State, the disease was contracted here.

The apparent relative immunizing power possessed by any climate against tuberculosis may be the effect of two different factors: First, The physiological influence of the climate may be such as to make it remedial in the diseased condition: or, second, the climate may so alter the healthy organisms that it resists the implantation and development of the tubercular virus.

The first factor determines the beneficial influence of climate on the sick, but the second determines whether this climate can also protect against infection of healthy people living here. That Colorado is beneficial in the first sense—*i. e.*, tends to recovery of the diseased body, I will assume as proved. Whether Colorado is efficient in the second sense,—that is, whether the physiological changes produced by this climate are such as to deter in an important degree the infective process here, is the all important question for us to determine; honestly, courageously, believing in that watch-word of science, *veritas vos liberabit*- the truth shall make you free.

A study of the geographical distribution of disease shows that many sections of the globe must have remained for ages

absolutely free from consumption; but after the advent of Europeans, tubercular diseases took root, and spread with a decimating virulence.

According to Hirsch*, "consumption is prevalent to a most disastrous extent among the native races of the Southern Pacific. In New Caledonia the death-rate from consumption among the Kanakas is estimated at 2-5 of the mortality from all causes. Almost all the authorities are of the opinion that the great prevalence of this malady in these islands dates from the time when the natives began to come into more intimate relation with European immigrants, and therewith to make considerable changes in their mode of life; and that opinion is borne out by the fact that in the Hawaiian Islands, where phthisis at the present time (1885) commits great ravages among the natives, it was of rare occurrence forty or fifty years ago. * *

The reputation that Australia used to enjoy for the rarity of consumption, and for the favorable influence of its climate upon the course of the malady, has of late been shown to have been a mistaken one. In Victoria, where the disease, it is true, has become a good deal more common only within recent years, the mortality from phthisis in 1886 was 6 per cent. of the mortality from all causes, while in Melbourne itself the death-rate rose between 1865 and 1869 from 2.22 to 2.52 per 1,000 of the population."

Rochard† says that we formerly thought the decay of barbarous races on coming into contact with civilization was due to alcohol, syphilis and change in mode of life; but we now know that it is the result of the introduction of tuberculosis. Osler‡ sums up well-known facts when he says, "no race is immune. * * The Negro race is very susceptible to tuberculosis, more particularly the glandular and osseous forms. * * The Indians of this continent are very prone to the disease. * * In the Blood Indian Reserve of the Canadian Northwest Territory, Surgeon Kennedy has given me the figures for six years. In a population of about 2,900, there

*Hdb. Geograph. and Hist. Path. New Sydenham, Soc. 1886, Vol. III.
†La Tuberculose. Revue de Deuxprondes, 1891.
‡Practice of Medicine. 1892.

were 127 deaths from pulmonary consumption, 23 per cent. of the total rate. This does not include deaths from 'diseases of infancy.' This enormous death-rate, it is to be remembered, occurs in a tribe occupying one of the finest climates in the world, among the foot-hills of the Rocky Mountains, a region in which cases of tuberculosis from the Eastern Provinces do remarkably well."

A year ago, Dr. H. R Bull,* of Grand Junction, read before this society a paper upon the tuberculosis among the pupils of the United States Indian School at Grand Junction, during a period of five years. He says, "during this period, the average number of pupils in attendance has been about 100, ranging in age from 8 to 20 years, the average at the time of enrollment being about 12 years." Bull found seventeen cases of tuberculosis, with eleven fatalities. He further says, "in two of these cases, general infection did not take place, and two were cases of tubercular peritonitis, leaving thirteen cases of pulmonary tuberculosis. Of these thirteen, nine have proved fatal and three, probably four, have recovered."

Evidence along these lines could be swelled into volumes. My only object in rehearsing such well known observations is to establish two points: First, however beneficial a given climate may prove to cases of consumption immigrating thereto, it does not absolutely, if sensibly, deter the inoculation of susceptible individuals with the disease. The climate of immunity is a myth and a dangerous fiction of pedantry. Second, the development and spread of tuberculosis among a people hitherto free from it, has invariably been in direct proportion to the intimacy of their associations with the race already harboring the disease.

When we turn from the consideration of the mode by which tuberculosis is propagated in a new territory to an inquiry into its development and prevalence in old communities, we find facts of deep practical significance for us. In a paper upon "the prevention of tuberculosis in the hospitals for the insane," Dr. J. W. Babcock† says, "while statistics prove that tubercu-

*Trans. Colo. State Med. Soc., 1894.
†Trans. Am. Medico-Psycholog. Assn., Vol. I, 1894.

losis causes one-seventh of the deaths among the whole population of the world, the figures collected by Hagen in 1850, from the reports of many asylums, showed that among the insane more than one-fourth of the mortality was due to this fatal disease. In 1892, Clouston, who has studied this subject more than thirty years. concludes that the fact that, under the most favorable conditions of life and treatment that we can at present devise for the insane in the best asylums, three of them die of pulmonary phthisis to one person in the general population at the same age, is full of interest and significance. Ireland says fully two-thirds of all the idiots die of phthisis. So great is the liability to death by tuberculosis in certain prisons that commitment to them is almost equivalent to a death sentence. Cornet found that during a period of fifteen years, the mortality from phthisis among males in Prussian prisons was 45.82 per per cent of all deaths; in females, 49.37 per cent. In the prisons of Austria the mortality from this disease reached 61 per cent during four years, while in the penal institutions of Bavaria it was only 38.2 during eight years. Among the 1,400 convicts of the Illinois state prison, at Joliet, fully one-third have consumption, and nearly all the deaths in that penitentiary are due to this single cause."

There are but two conditions which can be assumed to be common to the inmates of these various institutions:—First, close personal relations due to overcrowding; second, carelessness in their personal habits, of which modern science would regard the dissemination of the sputa as most important. Dr. Lawrence F. Flick* has reported clinical observations made to determine the condition of occurrence and distribution of consumption in the fifth ward of Philadelphia. He says, "the Fifth ward of this city is made up of a pretty even population, and is moderately densely populated, but not the most densely populated that we have. During twenty-five years the deaths occurring in this ward were confined to about 30 per cent of the houses of the ward, and many of these houses have recurrences as high as eight and ten times. During the year 1888, I

*Ibid.

investigated all the deaths from tuberculosis that occurred in the ward, and I found that of the deaths that occurred in the ward during that year, nearly 80 per cent occurred in infected houses and only 20 per cent in non-infected houses; 80 per cent occurred in 30 per cent of the houses, whilst only 20 per cent occurred in 70 per cent of the houses." In another place, Dr. Flick in a paper on the "Prevention of Tuberculosis,"† says: "Italy, in less than a century, reduced the mortality rate from the disease in her midst from that of a most virulent epidemic to a comparatively rare disease. England, by establishing especial hospitals for the treatment of pulmonary tuberculosis and the consequent isolation of its tuberculous poor, reduced its mortality 50 per cent in forty years, and Philadelphia, by preaching the doctrine of contagion and teaching its people methods of avoidance and prevention has reduced the mortality rate from the disease 20 per cent in eight years."

What has this to do with us? I have the honor to submit a series of twenty-one cases of tuberculosis, each of which, as nearly as could be ascertained, was contracted in Colorado, and which have been observed by me in private practice, in hospital service or in company with other physicians during four years in Denver. Two or three more such cases have fallen under my observation, but are not included because certain desired data had not been obtained. In but one of the twenty-one cases need the writer ask in any degree, confidence for diagnostic skill; this was in the person of a lady who, after intimate attendance upon a daughter dying of tuberculosis, had her lungs examined on account of a feeling of physical weakness; percussion dulness and faint inspiratory crackle were obvious at each apex. Only two of the cases are duplicated in the records at the Health Office of Denver. Of the twenty-one cases, fifteen were of pulmonary tuberculosis; one of pulmonary with laryngeal disease; one of pulmonary disease with involvement of kidney and bladder; one of kidney tuberculosis and slight lung involvement; one of general tuberculosis following infection of the bladder; one of pulmonary and probably meningeal tuberculosis; one of

†Medical News, 1893.

simple tubercular meningitis. Of the twenty-one cases, thirteen are known to have died; autopsies were performed on five. The sputum was examined, and tubercle bacilli found in eleven cases, including nine in which autopsies were not made. Of the eight cases which have not died, three passed out of sight while in a condition giving basis for a bad prognosis. Four were recent cases, and sought relief by change of climate, at least two of the four being in a rather serious condition. In only one case was there marked improvement. This was a lady who had lived in Colorado Springs all her life, and had probably been infected since infancy. At the age of 22 she showed signs of slight infiltration at the right apex, and was greatly reduced through the influence of a tuberculous kidney on the right side. Dr. Bagot, who allows the use of this record, removed the kidney, finding in its neighborhood, numerous tubercles, and the patient has since made extraordinary improvement, her weight increasing from 96 to 157 pounds within six months after the operation. One case, that of a physician who came to Colorado in robust health, but began very shortly to lose weight, which loss continued to the extent, I believe, of twenty pounds for nearly a year, when he sought a lower altitude. Two of the cases were those of miners who had lived and worked nearly continuously for eight and twenty-three years, respectively, at altitudes of more than 8,000 feet. No history of exposure to contagion could be obtained in these. Both expectorated tubercle bacilli, and both died. Fourteen of the cases were males and seven females. Excepting the case of tubercular meningitis in a boy of 4 years, nine cases ranged in age between 20 and 30 years, seven between 31 and 40, three between 41 and 50, and one died at 76. Three cases had been in Colorado less than one year when the disease developed, but the others had lived here for periods varying between two and twenty-three years. Fourteen had lived here five years or over. Of the fatal cases, with the exception of three cases in which the history seemed to show an illness lasting between three and four years, the duration of the disease was less than eighteen months. In eight fatal cases it was one year or under. These figures, as might be expected, are subject to considerable error. Likewise, the lo-

cality where the disease was contracted is not easy to determine where residence is shifted as often as here; for example, one of my cases was a Pullman railway porter, whose home is in Denver. The place of residence at the time of and for a period preceding the development of the disease was: Denver in eleven cases; near Denver, near Castle Rock, near Montrose, in Leadville, in Summit County, one each; in Central City, near Littleton, two each. In six cases a source of contagion could be definitely pointed out. In six, none such could be discovered, and in nine the evidence was negative. The occupations were most various; seven of the cases, with six deaths, were in ranchmen, miners and laborers. Two conclusions are suggested by these statistics: First, consumption contracted in Colorado is not an infrequent disease; second, when so contracted, it is of a most fatal type.

I am fortunately able to cull from statistical material representing vastly greater clinical experience than that of any individual. I will venture to quote briefly a few of the data to be presented in the report of the Committee on Sanitation and Preventive Medicine, to be presented at a later hour before this meeting. Thanks to the courtesy and scientific zeal of the Health Commissioner of Denver, Dr. Munn, a medical inspector of the Health Department, Dr. Spratlin, has been allowed to devote a great amount of time and energy in compiling from the records of the Denver Health Office the statistics regarding consumption during the years 1893 and 1894. During this period, according to the estimates made at the Health Office, the average population of Denver was 132,500. The total number of deaths reported was 3,404. Total number of deaths from consumption (all forms) was 812. The number of deaths from consumption reported as contracted outside of Colorado, 539. The number of deaths from consumption of which the place of origin is not noted, 173. The number of deaths from consumption in which the disease is distinctly stated as being contracted in Colorado, 100. This latter figure gives as the annual death-rate of the whole Denver population from consumption contracted in Colorado more than 0.37 per 1,000, as contrasted with 0.13, the rate estimated by Gardiner for Colorado Springs; 2.9

per cent. of the total deaths are due to consumption contracted in this State; and 12 per cent, of the whole number dying here from consumption have contracted the disease in this State.

The statements which I have made are open to public scrutiny; they challenge investigation. I see no outcome from their logic but the conclusion that, though Denver is still far ahead of cities of similar size in its low mortality rate, still consumption contracted here is making its way to the front as a scourge to us. This paper has but a single object,—a plea that we take up arms against this enemy. Who are responsible for the lives of the innocents if not ourselves? Even admitting that consumption is not an infectious malady, still, in the light of the knowledge forced upon us, he who does not treat it as if it were infectious, must be either a fool or a criminal. In what city is there a larger proportion of houses in which consumptives have lived and died than in Denver? Where do the babies oftener crawl upon infected carpets? Where are business and social intercourse with known cases of the disease more frequent? The world can not spare Colorado as a sanitarium. Nowhere else can the invalid so well combine the opportunity to regain health and to earn his livelihood as here.

Sanitary history makes plain the course to be adopted in checking, and keeping control of, this disease: establish isolated sanitaria for those who can recover; found isolated hospitals for those fatally afflicted. Let the doctrine of contagion be taught in the schools, and let cleanliness, in the scientific sense, be enjoined in all that pertains to the consumptive's life or death.

IS DIPHTHERIA DOOMED BY THE USE OF ANTITOXIN?

F. E. WAXHAM, M. D., DENVER, COLO.

Probably, with the exception of Koch's tuberculin, nothing in therapeutics has so excited and interested the civilized world as *antitoxin*, the new remedy for diphtheria. Like all other new advances and discoveries in medicine, it has its advocates, who claim it a specific when properly and timely used; also its enemies who decry its use and proclaim it a huge fraud; others

again who admit the value of antitoxin, but claim that its dangers more than offset its advantages; still again, there are others and among them, Virchow, who acknowledge the dangers of the new remedy, and yet claim that the lessened mortality under its use more than compensates for the dangers and risks of its employment. From all this conflicting testimony it is difficult to estimate its true value, but at the present date the evidence is decidedly in favor of its use. The opponents of antitoxin point to the anatomical lesions found in animals dying during immunization, to the changes especially observed in the spleen, liver, kidneys and lymphatics, and also to certain symptoms obviously following the introduction of antitoxin into the system, the most important being nephritis, skin eruptions, enlargement of lymphatic glands, and occasional high and fluctuating temperature. Deaths occurring one, two, or even three weeks from intercurrent diseases, after apparent recovery from the attack of diphtheria have been attributed to the use of antitoxin. The opponents claim, with much reason, that antitoxin should prevent, rather than produce, these symptoms, lesions and complications. They also deny the value of statistics, and claim that the lessened mortality is due to a lessened virulence of the epidemic at the time of the operation, rather than to any specific effect of antitoxin. The claim, therefore, that diphtheria is doomed, by the discovery of this, one of the most remarkable remedial agents of the present century, can hardly be sustained. If diphtheria were doomed, it should no longer exist in those centers of population where antitoxin and other means of controlling the disease are best known and most employed. Diphtheria should no longer exist in Berlin, Vienna and Paris. On the contrary, the disease is just as prevalent in these cities as before the discovery of antitoxin, although the fatalities may have been somewhat reduced.

The three great scourges of the human race have been small-pox, tuberculosis and diphtheria. The greatest of all, small-pox; and yet while we have an almost certain preventative in vaccination, the disease has never been stamped out. Its ravages have been greatly lessened and an untold amount of suffering and death prevented, and yet the disease still remains

and will continue as long as ignorance and superstition remains in the human breast. This being admittedly true of small-pox, with an almost unfailing and certain preventative, how much more true it must be of diphtheria, for which, as yet, we have no such panacea.

Antitoxin can in no way be compared to vaccination, for its effect is only temporary, lasting but a few weeks at the most. Again, all cases of diphtheria are not applicable for treatment by antitoxin, and I submit that mild cases that would terminate favorably under ordinary treatment, should not be subjected to the dangers of antitoxin treatment. Those who have followed closely the proceedings of the New York Academy of Medicine can not but be strongly prejudiced against antitoxin.

Personally, I am convinced of the great value of this new remedy. I believe that it is the best remedy that we possess in the treatment of a most dreaded disease; and yet I also believe that it has its limitations. Fancied security is often dangerous; to feel that diphtheria is doomed, and that we have an unfailing remedy in antitoxin may lead us to overlook its dangers, to neglect sanitary measures, and to belittle other lines of treatment.

As cases at home are more interesting than those reported at a distance, I beg te allude very briefly to the cases treated by antitoxin in Denver.

These cases number twenty-one. Fourteen cases were treated by members of the antitoxin committee appointed by the Arapahoe Medical Society, in conjunction with the attending physicians. Seven are reported to me by the Commissioner of Health, Dr. Munn, to whom I am under grateful obligation. Two cases were scarlatinal, and should be excluded from the report, leaving nineteen cases, eighteen of which were proven to be true diphtheria by bacteriological examination, with three deaths. The first death was in the case of an infant of 9 months, suffering from surgical diphtheria following circumcision. Antitoxin was employed on the eighth day, and the patient died some five days later. The second fatal case was an infant of 7 months; antitoxin was used on the fifth day, and death occurred one hour after the injection of the remedy. The patient was said to have been moribund when injected. The third fatal case

apparently recovered from the attack of diphtheria, but died of pneumonia seven days after the introduction of antitoxin. Whether the intercurrent pneumonia was due in any measure to the antitoxin treatment, I am unable to ascertain.

Admitting the value of antitoxin, believing in its efficacy as a most useful remedy, I would still claim that diphtheria is not yet doomed, but will still remain a most dreaded disease.

Notwithstanding antitoxin, and its great value as a therapeutic agent, we will still have need of the most rigid sanitary precautions and preventative measures, as isolation, disinfection and cleanliness. We still have need of all our resources, sanitary, medical and surgical.

One of the latest and most valuable contributions to the literature of antitoxin treatment of diphtheria has been written by Baginsky and Katz, of Berlin. After reporting a large number of cases treated they conclude that while exerting a most favorable influence in the majority of most cases of diphtheria ,yet antitoxin is by no means a cure all.

While expressing my conviction as to the great value of antitoxin; while acknowledging the indebtedness of humanity for the long and patient and scientific investigations which have resulted in the production of one of the most wonderful remedial agents of the Nineteenth Century, yet I submit, Mr. President, that the affirmative side of this question remains to be proven, and that diphtheria, while it may be mitigated, and its perils and fatalities lessened, will still exist, and will still continue to claim its victims.

SCARLET FEVER AND THE PUBLIC SCHOOLS.

C. F. SHOLLENBERGER, M. D., DENVER, COLO.

Beyond question the public schools are an important factor in spreading the contagious diseases, especially scarlet fever. This is proven by the fact that as soon as the schools open in September the number of cases of scarlet fever greatly increases. That the disease is at times very prevalent, and of a very malig-

nant type, is shown by the recent report of the Denver Health Commissioner, 144 cases having been reported during April and May, of which thirty-five, or nearly 25 per cent., proved fatal.

How do the public schools spread the disease? I believe that many of the mildest cases attend school either during its entire course, or for a few days, until the true nature of the disease is discovered. Or there may be a case at home, and through lack of medical attendance, a physician not having been called, the other children in the family are allowed to attend school, and thus carry the disease-germs. Then, again, the attack being a very mild one, the parents may be entirely ignorant of the true nature of the disease, and allow the other children to attend school.

Every city and town should have an efficient Board of Health. They should be guided by certain well-fixed rules, and, as nearly as practicable, adhere to them.

(*a*) Scholars afflicted with scarlet fever should at once be excluded from the schools, and not allowed to return until written permission is given by the Health Board.

(*b*) All scholars living in the family or in the house from which a case is reported should also be excluded from attendance. The children in the same family from which a case is reported are usually excluded, but this rule should be enforced in the case of *all* children in that house. It can easily be seen how the disease can be carried to the public schools from overcrowded tenements; but if the above rule were rigidly enforced, this very fruitful source of spreading it would be greatly abridged.

(*c*) Permission by the Health Board to return to school should not be given until sufficient time has elapsed to ensure absolute safety, and only after thorough infection by the proper authorities.

In many of the cities and towns permission is granted the tenants or property-owners to disinfect the house, but on account of the imperfect way in which this is often done, it should not be allowed. With imperfect disinfection, the disease can easily be carried to the schools, and thus the number of cases greatly increased.

(*d*) If a child afflicted with scarlet fever, mild though it may be, should have attended school, the school should at once be closed and thoroughly disinfected, before sessions are again held. This rule has never been strictly enforced, at least not in Denver, and we can well see how the disease can be communicated by the disease-germs which the afflicted child carried to the school-room.

(*e*) It should be taught, as the duty of all teachers, school officers and scholars, to report all cases of contagious disease which may come to their knowledge. This would serve not only as a matter of self-protection, but would greatly assist the Health Board in stamping out the disease.

(*f*) Immediately on receiving notice of the existence of a case of scarlet fever, the Health Board should notify the school authorities of the proper district, so that speedy and proper measures could be taken to exclude all children that might communicate the disease. Thus, if the Health Board and the school authorities acted conjointly, the danger of communicating the disease through the medium of the public schools would be reduced to a minimum.

How soon should children afflicted with scarlet fever be allowed to return to school?

Here opinions differ somewhat, but at least six weeks should intervene from appearance of rash until permission is given to return. All signs of desquamation should have disappeared, and no signs of sore throat should exist.

It might be advisable to have a longer period, say eight to ten weeks, from appearance of the eruption. It is always well in such a fatal contagious disease as scarlet fever, to err on the safe side. J. Lewis Smith places the time at eight weeks. Dr. Minot at four weeks from beginning of last case in family, but this is rather indefinite and unreliable. Dr. Jacobi says forty days from first appearance of the rash. Six weeks should be the minimum limit, and, before that time, written permission to return to school, should under no circumstances be given. To deviate from this rule in any given case, would be to open wide the door for infractions of the rule and thus proper precautions could not be observed. One instance

of how an efficient Health Board, assisted by the school authorities, can check the spreading of scarlet fever, is shown by the history of Boston. In that city from 1860 to 1875, the deaths from scarlet fever averaged one to every 1,000 of population. Since then, by rigid precautions on the part of the Board of Health and the school authorities, the number of deaths have been gradually reduced, until now, it numbers only one in every 3,300 of population. What has been done there, can be done here, and in every other community. In country districts, funerals are occasionally held from the public school buildings. When the person has died from scarlet fever or any contagious disease, this should, under no circumstances be allowed, the reason for this being obvious. If it is known that children have been exposed to scarlet fever, the school board should, in its discretion, be allowed to exclude them from attendance until all danger is past.

I believe that another cause, very commonly overlooked of comunicating the disease, is through the outer clothing of the children. The room in which such clothing is hung, is often very small and poorly ventilated, sunlight and fresh air being seldom allowed to enter. In some schools, no provision is made for hanging the outer clothing, and they are taken into the school room proper, and here the cause of the danger is proportionately increased. The clothing room should be sufficiently large and well ventilated with plenty of sunlight, so that on rainy days, the outer wraps, can be quickly dried. There is nothing like fresh air and sunlight to attenuate the breeding of the germs. The disease may also be carried through the school library books. This is a danger that should not be overlooked.

At the opening of the school term, if it is known that any of the pupils have been exposed to the disease, they should be excluded from school, until a reasonable time has elapsed, to ensure safety from contagion. If this rule were enforced, it would often prevent an outbreak of the disease, at the beginning of the fall school term.

I believe if all the above rules were strictly enforced, it

would only in exceptional cases, be necessary to close the schools, to prevent the disease from becoming epidemic.

Boarding schools, too, should be subject to sanitary inspection and give stated reports as to their sanitary condition. Last, but not least, the old adage, physician, heal thyself, should be applied as a potent remedy. What I mean, is this: that every physician should make it an invariable rule, from which there should not be a shadow of turning, to promptly report every case of scarlet fever that may fall under his care, no matter how mild it may be. We are constantly importuned, by parents, not to report cases of scarlet fever, especially, if they are mild, because, placarding the house, would exclude Nellie or Johnnie from school for six weeks, and "it would be too bad, for they stand at the head of their classes, you know." If we yield to the temptation, we may do a ten-fold mischief, and we will not be true either to ourselves or to our noble profession.

Even now our greatest glory consists not in curing disease, but in preventing it, and the great usefulness of our profession in the field of preventative measures will increase from year to year. So let me say again, promptly report every case of scarlet fever, no matter how mild it may be.

TYPHOID FEVER AND THE AGENCIES THAT CONTRIBUTE TO IT.

S. A. FISK, M. D., DENVER, COLO.

I regard this symposium as one of great interest to us as physicians, and one of great interest to the community. The eradication of communicable disease should touch us very closely. In the department of typhoid fever, I don't know that I have anything new to present: but the old is so good that if we follow it, it is quite as good as anything new. Most of the attention that has been devoted of late years to typhoid fever has been in the line of treatment, and great results are claimed: whereas it used to be that a mortality of 19 per cent. could be expected, and 30 per cent. was not unusual, that mortality rate has been cut down to low figures—8 and 10 per cent. This, however, is not exactly new. The extinction, however, of the disease is of greater importance than its treatment.

"A far greater blessing he secures
Who stops the coming ill than he who cures."

How can typhoid be blotted out? The answer comes from a consideration of what we know of its character, and its means of spreading. In the first place, it used to be regarded as due to atmospheric influences. But this theory of Pettenkofer is not accepted now-a-days, and we believe it to be due to a definite, specific bacillus, described by Eberth, Koch and others. It is an infectious disease, or only slightly contagious. I say that, because cases occur that give rise to the idea that it is somewhat contagious, Nurses attending typhoid-fever cases contract the disease and die. We have sad illustration of that, right in our midst. In the main, it is an infectious disease, contracted by the germ gaining entrance to the body, usually through the drinking-water; sometimes through the milk. It is a very hard matter to control the water-shed that supplies a town of any great magnitude. Efforts are being made, I believe, towards that end; for instance, in New York City. One case of fever, however, can do a very great deal of damage. Small-pox in Montreal, some years ago, came from one case in its hospital. The epidemic of typhoid in 1885 in Plymouth was due to one case, the stools of which were spread on the ground of the water-shed. You must pay attention to the water supply. See that no typhoid stools are spread out so that the bacilli are carried and gain entrance into the bodies of the people of the communities. Failing in this, what can we do to kill the germ if it has gained entrance to the water? It is well-known that the typhoid-germ is destroyed at a temperature of 63° centigrade, 140° Fahrenheit. The water can be boiled, and no water drunk except that which is boiled. Freezing will not answer. Prudden has shown that a typhoid-germ will live after it is frozen, and in the epidemic at Plymouth in 1885, the typhoid-stools were spread on the ground along in January and February, and frozen, and when the spring thaw came, then the epidemic occurred.

Typhoid has been spread through the milk. An epidemic has occurred in Stamford recently, supposed to be due to the impure water used in washing the milk-cans. The famous epi-

demic at Islington occurred from the same source. Close attention to this should be given. Animals have not been successfully inoculated with typhoid, so but little attention will have to be paid to the meat. I have just said that one case can spread a great deal of infection, and give rise to an epidemic. Therefore attention should be paid to each individual case. How do the typhoid-germs escape from the body? Principally in the stools, in the fæces. So here we can prevent the spreading, and it is our duty as doctors to look very closely after this. We should prevent the spread of typhoid from each individual case by destroying the germs that are in the stools. How can this be done? I suppose the most complete way would be, if it were possible, to burn them up. We cannot do that in many cases. It has been proven, however, that the typhoid-germ is destroyed by a 1-to-100 or 200-solution of carbolic acid, or 1,000 to 2,000-solution of corrosive sublimate. So that we have these agencies: Heat, carbolic acid, or corrosive sublimate. The stool can be thoroughly mixed with the solution of carbolic acid, and then boiling water poured upon it and allowed to stand, so that the mixture permeates every particle and destroys the germs, and then care can be taken to dispose of it properly.

Isolated cases occur in Colorado that puzzle us, where we do not know what the source of infection has been. We see persons coming down from lofty elevations, who have drunk of the pure crystal streams, taken down with typhoid fever. I remember a case of an old man living on the plains, on an isolated ranch, who was the only member of the family who had not gone off the ranch. They drank water from a driven well. He had typhoid fever and died, and was the only member of the family who contracted the disease. We are puzzled by these isolated cases. Whence is the source of infection?

Another question of interest to us arises as regards the peculiarities of a disease that has been described as mountain fever. Is there a distinct disease which we can designate as mountain fever, or is it typhoid? In this Society we have had able articles written on this subject. I remember a meeting in Pueblo in 1882, I think, Mr. President, when one of the Presidents of this Society, I believe he was President for that year,

read an article on mountain fever, claiming that it was a distinct disease. We have another article, read by one of our members, Dr. H. A. Lemen, a man who had large experience in an early epidemic of typhoid in this town, having charge of the County Hospital at the time, at which time he attended numerous autopsies, and he concluded that the mountain fever that we had here was nothing more nor less than a typhoid. The profession to-day, I think, is somewhat divided. My impression is, however, that most lean to the idea that the ordinary mountain fever is typhoid fever.

If the medical profession would take pains to blot out typhoid fever, it does seem on the face of it as though one of the great epidemic diseases of the world could be, if not eradicated, at least very largely controlled.

"THE EXTINCTION OF COMMUNICABLE DISEASES." SURGICAL ASPECT.

LEONARD FREEMAN, B. S., M. D., DENVER, COLO.

Since all well-informed surgeons recognize that diseases of wounds—erysipelas, tetanus, suppuration, septicæmia, pyæmia, etc.—are due to micro-organisms, the question presents itself, can we do away with these diseases entirely? Yes and no. We cannot hope to exterminate the germs themselves. Some of them can live outside the human body, others can continue their existence in animals; and, in addition, lesions will always exist under circumstances precluding asepsis or antisepsis. As long as there are susceptible individuals and susceptible wounds there will be wound-diseases, unless we discover some simple method of producing immunity.

We have learned, however, that under favorable circumstances we can make the bacteria keep their distance. In operative wounds, where aseptic precautions are possible, there is to-day little excuse for septic complications, although auto-infection, imperfections in *technique*, and the like, still permit of occasional "exceptions which prove the rule."

There is still too much carelessness abroad in the land; our responsibilities rest too lightly upon our shoulders. We have no

more moral right to needlessly expose a patient to infection than we have to poison his coffee or blow out the gas in his bedroom. And yet this is done every day, in every city, in every land; and we think little of it. We make a great ado about dangerous air and dangerous water, but we say little enough about dangerous doctors, although they often carry on their hands and instruments much more fatal poisons than generally exist in air or water.

Education of the people will help to remedy this. The microscope of truth in the hands of the laity will magnify the ill-doings of the careless surgeon until his numbers are thinned into comparative harmlessness.

It is a lamentable fact that the gospel of surgical cleanliness is still imperfectly preached in many of our medical schools—they are still in the shadow of the past, although it is no longer the umbra but the rapidly vanishing penumbra which surrounds them.

There was a time when hospitals were hot-beds of infection, where erysipelas and septicæmia lurked in every cot. This has changed; but it has left behind it a prejudice against hospitals which is slow to wear away. The best and safest work is done in hospitals; and the sooner the public recognizes this, the better. Surgical cleanliness can be carried out with system and with certainty. The trained surgeon, the trained assistant, and the trained nurse can work together in harmony, and with the best results. The time is rapidly coming when all operations in which rigid cleanliness is desirable will be done in hospitals, as far as possible.

Surgical cleanliness is not a thing which can be adequately learned in the lecture-room or from books. It requires personal experience and much practice. To be an expert in his art, appreciating all its phases, the surgeon should have studied among test-tubes and culture-media the germs with which he is in continual combat.

Prior to the introduction of anæsthesia, so much rapidity, so much nerve and training were required of the operating surgeon, that most of the work was confined to comparatively few specially prepared men. Then chloroform and ether so

altered the conditions that the knife appeared everywhere in the hand of the general practitioner. The requirements of surgical cleanliness have again changed the aspect of things, and surgery is rapidly and rightfully drifting back to trained men in well-prepared hospitals.

Much careless work is done in our public clinics, which are often imperfectly equipped for surgical purposes. It would not be surprising if steps were sometime taken for the regular inspection of these institutions by men appointed for the purpose, in order to insure adequate equipments and proper precautions. This is but due to the welfare of the poorer class of patients.

Among communicable surgical diseases, let us consider syphilis. Ever since the time of its supposed introduction into Europe, in the Fifteenth Century, attempts have been made to check its spread, or to exterminate it. These have all ended in failure. Aid has come, however, from an unexpected quarter —from the nature of the disease itself. Shortly after syphilis appeared, it became epidemic. Everybody had syphilis—kings and peasants, servants and ladies, prostitutes and priests, all suffered with this "touch of nature which makes the whole world kin." As mankind became more and more civilized, it became more and more syphilized as well, until to-day it would be impossible to find a family tree that is not gnarled with the disease in some portion of the trunk, despite the perfection of many of its branches. At first sight this seems like a calamity, but it is perhaps a blessing in disguise. Through the influence of immunity thus acquired, syphilis has lost much of its original virulence. We see no more the horrible ravages which characterized its onslaught upon humanity, and every decade shows a diminution in its effects. It is certainly "an ill wind that blows no good," and though we deplore Nature's methods we must rejoice in her results. Whether the disease will grow more and more attenuated, like the tail of the spermatozoid which carries it, until it vanishes into nothingness, is yet to be seen. The process is, in all truth, slow enough, but we will hope that it is sure, at least as regards the mass of humanity,

for there will always be non-resisting members of society in whom the virus will have full sway.

If we desire to study this immunizing process more intimately, we can do so in races where syphilis has recently been introduced. At first the disease spreads like wild-fire, leaving deformity and death in its track; but gradually immunity gains the upper hand, and the affection settles down to its usual quiet gnawing of the vitals of the community.

The question has been asked again and again, is there no way in which syphilis can be actively exterminated? It still remains unanswered. Enthusiasts have many times solved the problem in their own minds; but syphilis goes calmly on, hand in hand with His Satanic Majesty, avoiding all our pitfalls. If we close houses of prostitution by legislation, the business is simply directed into other channels where it is perhaps more dangerous. Inspection of the persons of prostitutes has proved an utter failure wherever it has been tried—in France, Austria, England, Russia, etc. As soon as registered prostitutes are inspected, the number of unregistered ones, who cannot be reached, increases (in Paris 100,000 women live by prostitution, while but 4,000 are registered.) And, in addition, it is impossible to make such inspection effective- small and concealed sores escape observation; a woman may be free from poisonous lesions to-day and dangerous to-morrow; and she may be the carrier of infection without being infected herself. Above all, a false sense of security is engendered which leads men into trouble who would otherwise remain virtuous. One of the greatest aids to morality is the fear of contagion. If we could assure every youth that a single transgression would surely be followed by syphilis, there would be far fewer transgressions. Moreover, to make inspection of even nominal value, men who frequent houses of prostitution should be inspected as well as the women, which is too impracticable to require discussion.

Something may be expected from the efforts of the "new woman," although few of us will be as sanguine in this direction as Sarah Grand in "The Heavenly Twins." Foolish notions regarding so-called innocence in girls have had their day, and we are beginning to realize that it is high time young women

knew more of the habits of men whom they expect to marry. Closer inspection and stronger opinions in this direction would certainly be productive of good. Women can do this. They are not helpless. They can investigate, taboo and condemn in an active manner if they will, and they are awakening to their power.

The most potent of the sources now at our command is education of the individual—the man, the woman, and above all, the young. Innocence of evil is well enough; but children are not innocent, especially boys. We all know that boys learn many things at a surprisingly early age; and the unfortunate part is, that they have impressed upon them the wrong side of the question—the distorted side. They often learn that it is an adventurous and manly thing to visit a house of prostitution, and that venereal diseases are more or less a joke. There is no one to undeceive them until, by familiarity, their minds have lost capacity for the full appreciation of the question. Our false and dangerous modesty should be cast aside. The young must be taught the consequences to themselves and to posterity of sexual immorality. This should be done not only by parents, but also in schools, perhaps by a physician appointed for the purpose. Facts alone should be presented; they are sufficiently startling without the wild exaggerations which are often made, and which lead to ultimate indifference and disbelief.

The education of men and women, and it is surprising how much they need it, will always be less effective than that of the young, but it is nevertheless desirable. We are too reticent on these subjects, we should say more about them; they require discussion and light, not silence and darkness. We cannot hope to exterminate venereal diseases in this way, but I am convinced that in time we could materially check them.

It is wrong to close the doors of hospitals to syphilitic cases, as is so often done. They should be freely received and treated like other patients in order to encourage their entrance into institutions and prevent, as far as possible, their leaving them until danger of contagion is passed.

It is possible that a method of producing artificial immunity may sometime be discovered, or means by which the disease

may rapidly and certainly be cured for all time; but until that millennium arrives we must struggle along as best we can.

A mistake is made in considering that syphilis is readily curable. We, as medical men, know better, and still we countenance the belief. It *is* curable to be sure, but the cure is always shrouded in uncertainty. Any one of us, if his own son had syphilis, would feel uneasy as to his permanent cure even though he had had the best of treatment. Many people unfortunately believe if they should get the disease, a certain sum paid to their doctor would make them as good as new again.

So long as the sexual passion remains the strongest passion in the world, and it will in our time at least, there will be many transgressions and many perversions. We can only strive to preserve the majority and let the minority go its way.

Gonorrhœa is more difficult to handle even than syphilis. People are more or less afraid of syphilis, but gonorrhœa is a joke. It is no disgrace to have the clapp. Many men speak of it with a certain pride, and its evil effects are so little appreciated that it is difficult to make some comprehend them at all. Noeggerath claimed that 90 per cent of marriageable young men in New York had had gonorrhœa, that 90 per cent of those retained it in a chronic form, and that a majority of these communicated it to their wives in one of the many forms of uterine and tubular affections. This is probably exaggerated, but competent observers have agreed with Noeggerath in the main; and there is certainly enough truth in the proposition to engage our earnest attention. The young need teaching in this direction more than they do in Greek or geometry; and the "new woman" should see that they get it, for it is upon woman perhaps more than upon man that the disease casts its baleful influence.

The virulence of gonorrhœa seems to have no tendency towards attenuation. We know of no gradually progressing immunity. We can hope for relief in the directeon of medication or inoculation, but we can expect nothing with certainty. We cannot sterilize every penis in the land nor every vagina, and we cannot keep men away from women; we can only teach, and wait, and hope.

DISCUSSION ON SYMPOSIUM.

PROF. VAUGHAN: Mr. President, I desire, in the first place, to thank you for the honor you have done me in electing me an honorary member of the Colorado State Medical Society.

In the second place, I am asked to open the general discussion on the subject of the extinction of the communicable diseases. I am an optimist, and I believe in the progress of the world, but I do not expect the millennium very soon. In looking back over the past few years of the history of our profession, we certainly have reason to be proud. Scarcely forty years ago, in the great hospitals of Prague and Vienna, puerperal septicæmia destroyed a large per cent. of lying-in women. Now in such hospitals the disease is practically unknown. Semelweiss showed the practical application of cleanliness. The genius of Lister enlarged and made more practical this work, and now Behring has come with his antitoxic treatment of diphtheria. The progress of medicine has been, during the present century at least, a constant growth, and I am sure that a committee might be to-day selected from this Society that could formulate rules for municipal and State hygiene which would result in the saving of thousands of lives annually. However, notwithstanding my pride in our profession, and my enthusiasm for its work, I do not expect to see the communicable diseases extinguished during my life. The eradication of these diseases must come by means of isolation and disinfection. All the antitoxines that can be discovered will not prevent the existence, and possibly not prevent the spread of disease. They may cure, but the greatest desideratum is that we may prevent disease. I believe that the historian of the future will point to the fact that we, the people of the United States, living at the close of the Nineteenth Century, lost 50,000 of our people annually from typhoid fever, and he will give this as an argument that we had not reached that high stage of civilization which we claim. There will be no answer to this argument. The loss in money to this country from typhoid fever alone is sufficient to place a water-supply above all suspicion in every city of 5,000 inhabitants or more in the United States. This would not be the case if our public hygiene was removed from all political

influence, and made subservient to the teachings of science. In true humanitarian work the medical profession is to-day far ahead of the world in general.

DR. ARBOGAST: In regard to the spread of these communicable diseases, there is, to my mind, one very important factor that has been overlooked by all the speakers, and that is the spread of scarlet fever and diphtheria by dogs and cats. In my own experience I know that a house dog spread scarlet fever to six different persons, and it is being done all over the towns and cities in the State, because I do not believe there is any other State in the United States that has as many dogs to the square inch as we have in Colorado. And he has free access everywhere. You can shut public schools; you can quarantine your city and your railroads; still the dog is a free gentleman, spreading disease everywhere. I just mention the fact, so as to bring it before you.

DR. MIEL: I was not fortunate enough to hear all that Dr. Fisk had to say in regard to typhoid fever, but I heard enough to justify me, I think, in saying a word or two as to the relation of mountain fever and typhoid fever. Dr. Fisk seems to think that mountain fever has no identity of its own. He is right in that, so far as I can see; but because it has no identity of its own he feels it necessary to attach it to typhoid fever, and says we must regard it "a typhoid." This loose way of using the term "typhoid" gives rise to much confusion. If Dr. Fisk had used the words "typhoid fever," I should not be dwelling on this part of the subject, but we use typhoid with pneumonia; and typhoid with other diseases, where it signifies prostration in a grave illness, or a grave illness with prostration. In that way the term can be used, but it is not the term to be used, because it is so often abused; its greatest abuse is in the term, "typho-malarial." Mountain fever, while not a disease of itself, is no other than remittent fever. There is no doubt in my mind that mountain fever is remittent fever, and I will say that during the time that I have been in Colorado (a large part spent in railway hospital direction in that part of the Arkansas Valley where this disease is more pronounced than elsewhere in the State), some 2,000 cases altogether, of mountain fever have

come under my treatment, and only three complicated cases have ended fatally. I do not wish to take the credit of treating 2,000 cases of typhoid fever with three deaths, but I do insist that each of these 2,000 cases have been what is known as mountain fever.

DR. STUVER: I want to call attention to just one question in connection with this discussion. We have had some very able papers pointing out the dangers of infection, and the diseases caused by pathogenic micro-organisms; but I want to call attention to the very great importance of building up a vital resistance against disease. Now, this must begin at the very foundation. It must begin with the beginning of the existence of the individual. The only way to accomplish it is by means of pure food properly adapted to the wants of the individual person, and by pure, fresh air, of which many people even in this enlightened age do not know the meaning of the term, and by proper clothing and hygienic surroundings. This is a phase of the question that appeals to the general public as well as to the profession. Every family should know the general principles of hygiene; every school-teacher in our broad land should be able to inculcate proper rules of health, and give the children under his or her charge directions how to build up a strong physical condition; and I believe—and this is a point I wish particularly to insist upon—that it is the duty of every physician in every school district in our country to call the attention of the teachers to the great importance of insisting upon a proper knowledge of the laws of health, and of the influences that build up organizations, so that they are in a position to resist disease. It has been very clearly pointed out to-day that not every person who is exposed to the contagion of diphtheria or to scarlet fever or tuberculosis, contracts these diseases. This shows conclusively that it is the debilitated, run-down individual, who lacks vital resistance, that contracts any disease with which he or she is brought in contact.

DR. AXTELL: I think the thanks of this Society are certainly due to Dr. Freeman for the able manner in which he has dealt with the subject which has been tabooed in the past to such an extent that it is very seldom mentioned. The subject

of the sexual relations, especially the appearance of diseases as syphilis and gonorrhœa, is something that certainly should be taught to the young. It comes home to those who have young ones about them. The relations of the sexes should certainly be taught by the mother to the child, probably by the father to the son; and these things should be taught early, sufficiently early to be of service to them in the future.

DR. STODDARD: While it is true these things ought to be done, I do not see how it is possible to have them done, unless we reorganize the human family—make it all over new with different kind of material. We will have to commence with the father and make him a different man, of different kind of material—make him so that he can tell his boy of these diseases without having to say, "I have had practical experience in the business;" and so on through the list. And it is well enough for us to say that the school-teacher shall teach this and that and the other thing in the schools. Physicians know that they even do not teach what they know, when they have an opportunity to do so. I think a great deal of responsibility rests with physicians all over this country. They will have a case of scarlet fever, and just as soon as the child is able to get out of the sick-bed, he lets the child go to school. I know this to be done. This is not a chimera; not imagination. It is a fact that they let the child go to school when he is literally far from free from the effects of the disease. Whether the doctor does it through ignorance, or through cussedness, I do not know; that remains to be seen, and remains perhaps with himself. I think if in our medical schools there was a little more teaching in the *right* direction it would have a good effect. We frequently see articles written by men who are holding professorships that would disgrace, absolutely, a school-boy; and they should know the dangers that are put forth in these articles. Yet these men are teaching our young men, our future rising generation of physicians.

DR. FERGUSON: I heartily endorse the gentleman from Colorado Springs in his argument, and will say further that I think a good deal of the spread of contagion is due to the attending physician. In the first place the physician in making

his call, will get in a hurry and won't stop to instruct the family in the importance of being careful with the other children; and, furthermore, a good many physicians neglect having scarlet fever signs put up here in Denver, for at least five days after scarlet fever should have been diagnosed.

It would seem to me, after a diagnosis has been made, that in the first place a thorough ventilation of the sick room should follow, without allowing any draught on the patient, and at the same time to keep the other children out of the room and away from the patient. This would help very much in the way of controlling the contagion and stamping out the disease. In the second place, follow out the old line of treatment, give the child a cold sponge bath, followed by thoroughly melted cocoa butter or olive oil on the patient, or something of that kind. This, of course, is after the desquamation has commenced, to prevent the scales falling around and getting on the clothes of the physician and the other members of the family. I think the bed clothes and the clothes of the child ought to be changed once a day, and the physician himself change his clothes before visiting other families. This is hardly carried out by the physician at all. I think the spread of contagion rests largely with the practicing physician.

DR. W. L. FREEMAN: I would like to say a word in regard to the time that infection takes place from scarlet fever. I have recently had a case in a family, a child aged 4 years, and ten days later a child of 6 came down with it. The family lived in one room, and it was impossible to isolate the cases. One child in the house, 18 months old, had no symptoms of the disease whatever. Another one, 8 years old, had no symptoms of the disease. The cases of 4 and 6 years of age were well-defined cases, and desquamation well-marked; so that there was no doubt it was a case of scarlet fever. In regard to changing clothes by the physician; I have had some experience in scarlet fever, and I do not know that I ever carried a case into a family. I remember distinctly of attending a case of typhoid fever, and just a few blocks away I had a case of scarlet fever. Usually I went to see my typhoid patient first, and then to the scarlet-fever patient. Then at times my work was such that I would

have to go the other way. This young man with typhoid fever had no symptoms of the scarlet fever. I would say that in the early stages, when the child is vomiting and the eruption is appearing, I have never known a case to be carried. Many times other children would be in the house and sent away, and no disease would manifest itself. But at the time of desquamation I have always noticed that the disease, if contracted at all, was contracted at that time.

DR. DAVIS: I did not hear all the papers on the symposium, but will say that I heartily endorse the paper which Dr. Freeman read on surgical infective diseases, and with reference to gonorrhœa and syphilis especially. While syphilis might not be considered a surgical infective disease, I consider it so, and I believe that gonorrhœa accounts for more surgical operations than any other one known trouble.

The percentage of gonorrhœa in young men of New York city, as given in the paper, I do not think was overestimated. I believe that 90 per cent of all males raised in cities of over 5,000 population, have had gonorrhœa sometime in their lives, nor do I except any profession or occupation, be they lawyers, doctors, tradesmen or of other callings.

The difficulty remains that the stopping of the active discharge does not always cure the disease or stop its ultimate injuries. Many women who marry practically moral men become diseased from latent gonorrhœal troubles, and frequently have to be operated upon, to say nothing of the dangerous sequela in the genito-urinary tracts of the male.

I think, above every other surgical infective disease, that gonorrhœa is the greatest curse to the human family, and the source of more invalidism and suffering, and the cause of more surgical operations than any other one disease. I am governed by the statistics of Tait and others who have had much operative experience in such cases.

Speculating on the innoxiousness of latent gonorrhœa is dangerous, and the belief in its harmlessness has been the cause of thousands of innocent women to lose their ovaries. This fallacy cannot be eradicated too soon, nor too thoroughly. The man who does not use the microscope is in no wise competent to

judge in these matters. The best authorities we have do not differ as to that.

When I spoke of gonorrhœa as being the cause of more surgical operations than any other one disease, I meant exactly what I said, what I believe statistics to prove, and what I know my individual experience has taught me.

It does not follow that a man shall have an active urethritis to engender an active gonorrhœa in another. Frequently when no discharge whatever presents at the meatus, a careful microscopic examination of the tripper-fadden will reveal gonococci. All men with strictures or latent gonorrhœas do not infect their wives, but many do. I have nothing to do with the purity of the wives -I am dealing with facts. Nor do all wives who have gonorrhœa get it from their husbands any more than that all wives that have gonorrhœa contract it clandestinely.

PPESIDENT WORK: Dr. Failing, of Grand Rapids, Michigan, is with us, and we should be glad to hear from him in this discussion.

DR. FAILING: It has been a great pleasure to me this afternoon to listen to the able papers that have been read here, and especially to notice the animus that exists among you for accomplishing the objects desired, viz: to prevent the spread of contagious diseases. We have struck the keynote in Michigan in eradicating contagious diseases. We have labored with this question for a great many years, and depended upon the honor of the laity, physicians and others to report contagious diseases to the Board of Health, but without success. We have a State law now, which requires any person (laity or physician) to report all contagious diseases to the Board of Health, and if they fail to do so, they are subject to a fine of $100 to $500, or imprisonment for six months, or both, at the discretion of the court; and since we have had this law we have had no epidemic of scarlet fever or diphtheria in the city of Grand Rapids; and I attribute it to this law; and I think, gentlemen, that we can never be successful in preventing the spread of contagious diseases under any other conditions. I think Prof. Vaughan, of Ann Arbor, will agree with me that we have lessened the mortality from contagious diseases; I do not remember the

percentage, but it is remarkable. We report typhoid-fever cases, and the Board recommends that we report tubercular cases; although this is not compulsory. It lies within the power of the Board of every city, or township to close any school at their will if they think it for the benefit of the public.

DR. ROTHWELL: By latent gonorrhœa is meant a form or stage of that disease in which all its signs and symptoms have disappeared, and yet the special germ—the gonococcus—lurks within the urethra, ready to infect imprudent wives and imprudent maidens. It is not gleet; it is something much less obvious and far more treacherous. I do not wish to deny the existence of such latency, but to express my conviction that it is the exception, and not at all the rule, as the followers of Noeggerath maintain.

I practiced medicine for a number of years in a mining camp, in which there were, of course, many bachelors. Gonorrhœa was no phenomenon among them. I treated many of them for the disease. In after years I saw them marry, and waited on their wives in confinement, but never witnessed a single case of post-marital gonorrhœa among these women, nor ophthalmic infection in their children. It can not be of frequent occurrence, or else my experience is unique.

Since coming to Denver I have seen several distressing cases, both of acute and chronic disease, in wives, distinctly traceable to gleet in their husbands. These are facts of observation, and of value in deciding for or against theory. "*Grau*," says Goethe, "*ist alle Theorie.*"

LOCOWEED (ASTRAGALUS MOLLISSIMUS): A TOXICO-CHEMICAL STUDY.

CARL RUEDI, M. D., DENVER, COLO.

The history and literature of the chemical examinations on loco are found well described in the reports of the State Agricultural College of October, 1893, Fort Collins, Colorado, written by David O'Brine, chemist. I do not need to enter into details, but I wish to read some of the conclusions he comes to, as far as loco is concerned:

"In conclusion, we would say we have been unable to find any alkaloid in the plant examined though we get alkaloidal reactions from the loco. We have not been able to produce any physiological action upon rabbits with the extract from the loco in any of its forms."

"The post-mortem made, showed such a variety of diseased conditions that in our judgment they could hardly be due to one or the same cause."

When I came to Estes Park in June, 1893, Mr. Stuyvesant brought a herd of sheep into this park, and a few days after their arrival a number of them fell ill and twenty-seven died. I had the opportunity to see and to examine them alive, and to make some post-mortems. The appearance of the diseased sheep was most striking and I can only compare it with that of an animal dying from cerebro-spinal meningitis, with one difference: In cerebro-spinal meningitis the temperatures run very high, while in these sheep the temperature was low, except in some cases where incipient pneumonia may have produced a rise of temperature to 102 degrees Fahr. The usual run of temperature was from 98 to 100 degrees Fahr. The appearance of all these sheep was pretty well the same; lying flat on the ground, not able to stand, and not able even to lift their heads to drink the offered water; the head and the vertebra in opistotonus position; the four legs stretched out and stiff; breathing was stetorous, pulse slow, abdomen much distended and diarrhœa present. The pulse called for my particular attention, and on auscultation of the heart I found that the action of the heart was very slow and insufficient. By these observations I was sure that some poison was in play, and Mr. Stuyvesant and the manager of the ranch told me that these sheep had come over from North Park only lately and were feeding in a pasture where locoweed grew frequently. These sheep died, every one of them, and I had the pleasure of autopsies. Paleness and anæmia of the muscles; abdomen greatly distended; the intestines filled with gasses; the blood vessels in the mesenterium filled to the utmost with blood; no peritonitis, no ascites, no ecchymosæ in the mucous membranes; liver very heavy, enlarged, filled with blood; spleen not enlarged; kidneys normal, but con-

gested: the bladder filled to the utmost in all cases. In the lungs I found hypostatic pneumonia, particularly on the side the sheep were lying upon; and the heart stopped in full diastole. The most striking part of the post-mortems was the brain, which showed itself to be absolutely bloodless. The brain-substance was so anæmic that it was difficult to fix the margin between gray and white substance, and exactly the same appearance the medulla oblongata showed. After this experience I made up my mind to look into this poison more fully, and walked carefully over the pasture where these sheep had been for the last two days. I came across a field where the astragalus mollissimus was very plentiful, and this field gave me afterwards the material for my investigations. (The contents of the stomach and the intestines I, unfortunately, did not collect; but, anyhow, it would have been of little use, as all the animals suffered from diarrhœa.) The plant goes generally under the name of "white loco." I prepared different solutions from the plant, and injected every day 10 ccm. into the stomachs of the rabbits. After only five injections one of the rabbits died, and the post-mortem showed to a nicety the congestion of the whole tract of the vena portæ and the anæmia of the brain. I put six rabbits under the influence of loco, and the effect was marked, but not rapid, if not given in very concentrated solutions. The solutions were prepared differently, and each of the rabbits had its own preparation, but the effect was nearly the same. In the beginning loco acts as a stimulant; the animals get lively, hilarious, running about, cleaning themselves, etc. This lasts about eight hours, then they become very quiet, sit in a corner of a box, and one can do with them pretty nearly what one likes; they do not move from the place, or just run into another corner, to fall back into the same complacent reverie. One can leave the door open and hammer away at the box, but they do not show any inclination to run away. During the excitement, however, they became fierce, and I had once the opportunity to watch one of the drollest things possible: One of the rabbits, two hours after dosing it, got loose and ran under a porch. A heavy tom-cat came near this hole, and commenced sniffing about; this offended the rabbit highly and it

jumped on the neck of the cat, bit it through the skin, and the cat ran screaming away. When the animals are first under the influence of moderate doses of loco, they suffer greatly from hyperæsthesia of the cutaneous nerves; when one touches them with a stick while lying in a corner, without hurting them, one sees the platysma working away very forcibly, and sometimes they utter sounds of pain. According to my experiments the locoweed works slowly but surely; as soon as the anæmia of the brain sets in, the animals act in every respect mad-like; one hour they are excitable, and then again as dull and as languid as can be. The rabbits eat, when well, very quickly and whenever they have the opportunity; not so the locoed rabbit; he eats slowly for a minute or two, then he goes into a corner and meditates, comes forward to nibble at a carrot or a piece of cabbage, but he never eats greedily, and does not steal it from the mouth of his neighbor, or only very exceptionally. I observed these rabbits for ten days; they did not die, because I gave them weaker solutions; but they all became very ill, and as I had to leave the park I killed them with the needle inserted into the medulla oblongata, and made the post-mortem. In all of these cases I found great congestion in the abdomen, and marked anæmia of the brain. The congestion of the vena portæ commences certainly very early, but, still, the first symptoms are the nervous symptoms. First as excitans, then depressing or sedative, with a marked hyperæsthesia of the cutaneous nerves. If these rudimentary experiments should prove correct, the loco would have a great future in the hands of the neuropathologists, as a remedy that would counteract the hyperemia of the brain and the medulla oblongata, and would be the first representative of this class, as ergot can be hardly called doing this duty. I made at the same time control-examinations with one rabbit, injecting into his stomach a decoction of herbs for ten days, but there was no alteration in his behavior, and he was as greedy as ever.

Chemical Examination of Astragalus Mollissimus.—After experimenting with astragalus for some time, I found that the easiest and best way to get at the different ingredients is the following: take five pounds of the whole plant, roots and all,

the younger the better, and after cleaning them well from sand and earth with a brush, cut them up fine and keep them well covered with water at a temperature of 150° to 160° Fahr. Do not allow the water to boil at any time. Let it stew three days and press the fluid well out of the plant; evaporate over a water-bath to one-third of original quantity of fluid, pour into a two quart bottle one quart of the remaining fluid and add one pint of petrol-ether. Shake it well and after that as far as possible the resin which always greatly interfers with the micro-chemical examinations' may be well removed; sometimes it is necessary to repeat this process two or three times. After separating the petrol ether from the watery extract one will find this to react strongly acid. Put the fluid over the water bath again, and drive the remainder of the petrol ether off; then you decide what you want to have in the end, because later on the same alkali has to be used again. Neutralise this fluid most minutely with either potassa, sodium, ammonia or magnesia and filter until you have a clear brown red fluid. Test on acidity again and neutralise again if necessary. This done, fill the fluid into a tightly fitting glass-stoppered bottle and and add a liberal supply of ether; shake it frequently and let the ether be in contact with the fluid twenty-four to twenty-six hours, then separate and evaporate the ether slowly in a watch glass about six inches in diameter. One expects to find an alkaloid in the substance remaining, but this is not the case; the few drops of an oily fluid have a perfectly neutral reaction and I can only call it a vegetable base. If one treats this base with acids, one has to use extremely weak solutions; I found that 2 per mille. of the different acids is the best form to be employed. The sulphate of Locoin crystallises in dentitric forms and separates well from the sulphate of calcium, which is always an annoying one. The nitrate of locoin as far as I could make out, is an amorphous powder of a greyish-shiny appearance and not soluble in water, nor alcohol, nor ether, but readily soluble in accidulated water. I got it best by filtering an accidulated watery solution into a large quantity of high grade alcohol, when the nitrate at once went to the bottom of the vessel. The muriate of locoin I have not seen yet. Locoin is hardly poisonous; the small quantities I had to do with

had no effect upon animals. More poisonous, however, is the loco-acid; namely, after the ether has been separated from the watery extract, which has been previously perfectly neutralised, one will find the remaining fluid reacting strongly acid again and one has to add a considerable quantity of the same alkali as first used to make the fluid slightly alkaline, which it must be for further manipulation. This done, evaporate the fluid in a glass dish over the water bath to dryness and you will find the potasse crystals lying in parallel fine needles, the ammonia salts in mathematical cubes, mostly two of them forming a double-cube; the soda salts I have not seen. The ammonia salts are the easiest obtainable.

So I found in the astragalus mollissimus two well defined chemical bodies: 1, the base locoin, which as far as I can say is fairly innocous and forms salts with sulphuric acid and nitric acid and probably with others, but they have not been tried and has a smell *sui generis* (like burnt French prunes.) 2, the loco-acid, which probably is nearly related to the oxalic acid and forms salts with potassa and with ammonia and probably with others. One further remark I wish to make in addition to this: the plant does not always yield the same amount of these products, neither every year nor in all places; these plants that grow in a hot summer and on dry soil show the greatest quantity of acid and locoin; plants collected in wet summers or on wet, marshy places, show but very little of these substances. Most of the poison is contained in the tubera, out of which the leaves and the flower-stems proceed, just rising above the ground, and, therefore, in dry summers when the pasture is scanty, and the cattle have to graze very low, most of the cases of poisoning are observed.

I must add that organic chemistry is not my profession, but my hobby, like photography and bicycling with others; but if I can give anybody more competent than myself a hint in examining loco: "please don't overheat it" and "never be in a hurry, give the reactions time." Locoin is absolutely neutral and loco acid easily decomposed.

DISCUSSION.

DR. HALL: There are a number of features connected with this weed which Doctor Ruedi has evidently not had time to touch on, in connection with this very interesting paper. One is, the reason why cattle and horses eat it. I had a very wide opportunity, for eight or ten years that I lived in the country, to see something of the effects upon animals of this weed. One reason why the cattle eat it is, apparently, that it is about the first green thing that comes above the ground early in the spring, and cattle seem to contract the same appetite for this, as horses do, and I presume, although I have not studied that particularly, it is as man does for opiates. It seems, after getting the stimulating effects of this weed, in the region where it grows, they seem never to be able to keep away from it.

There is another matter that the doctor has not had an opportunity to examine, and which I have recently mentioned to him, and that concerns its effect upon the uterus. I know of one instance, which I will state briefly. A band of forty mares fed on Cedar Creek, in the northeastern part of this State, and in a region which was particularly infested with this weed. When the spring came, there were but nine colts out of the forty mares, although it was known previously, during the winter, that thirty-three of them showed the usual signs of pregnancy in these animals. Thus, only nine were carried through, the rest of them having been lost. I have been interested in considering whether this is because of the fact that these animals lost flesh and deteriorated in their general condition when eating the locoweed, as we are told is the case in animals which eat ergoted grain; or whether due to the specific action of the locoweed on the genital apparatus. On that particular point I have not been able to come to a conclusion, although the great frequency of abortion in these animals points in the latter direction. I have been very much interested in the paper.

DR. DAVISON: I have been very much interested in Dr. Ruedi's paper, because it brings forth some further knowledge on this subject. His conclusions are considerably at variance with those of Prof. Sayre, of the Kansas State University, and those of Dr. Davis, connected with the State Board of Agricul-

ture, of New York, I believe. Neither of these gentleman could trace any poisonous effects to the locoweed. There seems to be, in their minds, the opinion that possibly some of these deaths were caused by eating other plants than *astagalus mollissimus*, a plant like it in shape, perhaps, but differing botanically, and recognized by the botanists. Among these plants in particular is one called *oxytropis Lamburtii*, which resembles *astragalus mollissimus* in shape, but differs from it slightly in a botanical way.

The doctor went to the trouble of examining cases of horses reported to be poisoned by eating locoweed, and as a result of his conclusions he could not make up his mind that the locoweed had anything to do with the death of the animals. He attributed it to other causes, coincident with the eating of loco. No less authority than Professor Dragendorff states that there is no alkaloid to be found in *astragalus mollissimus*, thus coinciding with Dr. Ruedi. Professor Kochan, of this city, also examined the plant; and he suggests that possibly much of the effect of the loco may be due not to the plant *per se*, but to fermentative changes taking place, resulting in something analagous to the ptomaines that are found by decomposing animal matter.

DR. BURNS: Dr. Ruedi mentioned but one kind of locoweed; there are, however, two kinds, the red and the white. Loco-eating becomes a habit, like morphine-eating. Animals once eating loco desire it afterwards, and continue to eat it, although they may be in the best of pasture-land. Horses are more liable to be poisoned than other animals. Blindness frequently follows. The course of the disease is, as a rule, slow.

DR. MACLEAN: While I do not agree with the remarks of Brother Hall, I do not mean to say he used locoweed because he lived in a loco district; but from my experience in the country where locoweed was about; from my conversation with cattlemen, horsemen and my own observation, has not been along the line of Dr. Hall's experience. However, he has left a loophole, inasmuch as the abortion in the animals might have been caused by the cold of the winter and want of food, as the phenomenon occurred in the spring months, when the animals were run down and starved, from a hard out-door life in the winter. There are

many here who have lived in these districts, who will not agree with Dr. Hall that the plant is known to have these particular or peculiar effects. I was very much pleased indeed with Dr. Ruedi's paper, as it seems to be the first thorough investigation know to me of this plant, outside of a pretty thoroughly good investigation by the Agricultural College. We all know it does produce certain symptoms. I notice that anæmia of the brain is one of the things observed, and this is correct. Along that line there is a therapeutic hint thrown out as to the value of this plant. I have greater confidence in the doctor's investigation than I have in our Eastern friends spoken of by Dr. Davison, because the plant will lose much of its strength in being transported to the East. The way to investigate these things is on the field, and on the post-mortem table of man or beast. To my mind, the best that can be gotten out of the paper at present is its local value. It is a question as to whether the habits spoken of by Dr. Burns are established in the same way as in that other animal (man) in the use of certain drugs. I think it is lack of ability to walk, that is the secret of these animals hanging around the locoweed districts, and their loss of appetite, and all that sort of thing; and there is no doubt there is, perhaps, a stimulating effect for a time; and these may be the reasons, more than the acquiring of "the habit" for the eating of this peculiar plant.

DR. DAVISON: I wish to correct the statement that Professor Sayre did not investigate on the ground. He did, however. He followed up, in his capacity as Professor of the Kansas State University, cases of horses supposed to be dying of locoweed, and in no case could he trace the death to loco.

I wish to suggest one other thing: Up to a few years ago, cattle and horses on the range were raised in a most brutal manner; that is, they were left out in the winter to rustle for themselves. It was all right in Mexico, and warm regions, perhaps, but always in the spring of the year they came out thin and emaciated. The females can not carry their young, in my opinion, when thus reduced, and the death of animals from want of food is to be borne in mind when investigating any case of supposed loco poisoning.

DR. RUEDI: I hoped that the discussion would show me the feeble points of my examinations, but as nobody touched upon the chemical part of my paper I have to try to explain a very strange point in it. After neutralising the watery extract of the plant and extracting it with ether one expects the remaining fluid to be neutral; but this is not the case. The only explanation I can give is this: astragalus is a leguminosa and they contain about one-fourth per cent of fatty substance; now when this watery solution, absolutely neutral containing this fat-molecule is brought into contact with the ether, the ether is able to split up this fat-molecule and to absorb the glycerine or glycoside, which is neutral, while the fatty acid set free has greater affinities to water than ether and is swallowed up by this, which shows then the acid reaction again. This is the explanation I gave myself, whether it is correct or not, I leave to others to decide.

ETIOLOGY AND TREATMENT OF FUNCTIONAL CARDIAC DISEASE.

J. N. HALL, M. D., DENVER, COLO.

From cases seen in private practice in Colorado, I present a record of ninety-four cases of cardiac disease. Hospital and dispensary cases are purposely excluded, because it is desired to show so far as possible with so small a number of cases, something of the frequency with which the different forms present themselves in practice in this region.

Of the ninety-four cases, thirty-one were organic in character, and sixty-three such as we commonly term functional.

It may be briefly stated that of the former, sixteen were cases of mitral insufficiency, four of mitral obstruction, two of aortic obstruction, five of dilation without valvular disease, one of angina pectoris fatal in the first seizure, one of hypertrophy with functional disturbance, such as DaCosta terms "irritable heart," one of congenital pulmonary stenosis, and one case of displacement of the heart under the right nipple from contraction of fibroid phthisis, although the organ itself showed no especial signs of disease. Of the sixteen cases of mitral insuffi-

ciency, one was complicated with aortic regurgitation, one with congenital pulmonary stenosis, one with tricuspid regurgitation, one with interstitial nephritis, and one with pericarditis with effusion.

Of the sixty-three examples of functional disease, the trouble for which the patients sought advice was directly connected with the heart in almost all of the cases, being either palpitation, tachycardia or cardiac pain, or various combinations of these factors. An exact analysis of the symptoms in the cases does not seem of sufficient value in this connection to justify its insertion. Many cases of temporary disturbance of the heart's action were noted, of course, and especially in connection with acute disease, not included in this table.

Of the sixty-three cases, thirty-three were in males and thirty in females, although the latter are generally stated to be more subject to the trouble in question.

Of the males, in thirteen, the disturbance was undoubtedly due to tobacco, in excess, eight to tobacco and coffee, and two to coffee, making a total of twenty-three due to these two drugs.

In five cases the trouble was apparently explained by the presence of severe anaemia; in one case it was associated with epilepsy, and in one with indigestion; in one with mental excitement, while in two cases no cause could be assigned.

Of the thirty cases in females, five were due to tea in excess, three to coffee, and one to tea and coffee combined, making nine cases of toxic origin. Nine cases were of anaemic origin, one of these depending upon the inanition of vomiting of pregnancy. In three cases the trouble arose from indigestion, in two from mental excitement, in two from too sudden change to a higher altitude, in one in association with severe neuralgic pain, and in four cases no cause could be assigned.

Of the total cases, then, twenty-three males and nine females, or thirty-two in all, were of toxic origin, while fourteen cases in all were in association with anaemia. The toxic form prevailed in males, the anaemic in females. Four cases in all were attributed to indigestion, three to mental excitement, including under this heading grief, five cases were what we may term "scattering," and five were unexplained.

It is encouraging to note that in so small a proportion of cases was the cause obscure, and especially so when we recall that we are necessarily so little acquainted with many of our patients, as to be utterly unable to fathom those mental causes so prolific in causing circulatory disturbances. It is likely that in some of the unexplained cases, some hidden cause such as anxiety or grief, was the active factor.

It is noticeable that in men who use tobacco, worry and anxiety, as in times of financial trouble, and idleness, as in ranchmen and cowboys during the winter, cause an increased use of the weed, and hence are likely to give an origin to cardiac trouble.

In none of the cases of tachycardia has exophthalmic goitre developed, so far as is known, although it is a possibility to be borne in mind in these cases.

As to treatment:— In the toxic forms, the tea, coffee or tobacco was withdrawn in part rather than entirely, and commonly some of the bromides prescribed. The disturbed digestion, so common in these cases, and especially in those chewing tobacco, has generally yielded readily to bismuth, often combined as indicated with soda or some laxative. Sleeplessness, also frequent in these cases, has been met with moderate doses of chloral for the first two or three nights, until the bromides had quieted the disturbed action of the heart.

In the anaemic forms, iron has been given, very commonly with some laxative, and with sufficient bromide in some form to give relief from the palpitation, and sleeplessness. One case dependent upon the vomiting of pregnancy recovered promptly after the latter had yielded to quarter grain doses of cocaine, the patient in this case having lost forty pounds of flesh.

The cases brought on by too rapid ascent from a low altitude to a high one were treated by rest, chiefly, one also needing digitalis. Both were relieved promptly, and returned to a lower level.

When no cause could be discovered, the treatment was entirely symptomatic.

Of the sixty-three cases, but one, to my knowledge, has developed valvular disease. This woman, 40 years of age, under

observation nine years, first complained of palpitation apparently due to indigestion. She has had during the past four years several attacks of rheumatism, which abundantly account for the mitral reurgitation which now exists. This instance helps to substantiate the generally received idea that functional disease does not commonly lead to anything more serious, excepting in cases which develop into "irritable heart" as mentioned above, with more or less hypertrophy. Two of the cases reported here as functional disorder are apparently developing slight increase in cardiac area, and seem likely to eventuate in this form of organic disease.

TWO CASES OF ABSCESS OF THE LIVER, WITH REMARKS ON DIAGNOSIS.

H. B. WHITNEY, M. D., DENVER, COLO.

I wish to present to your attention a brief report of cases not of daily occurrence in this region, and to offer a few remarks concerning the diagnosis of hepatic abscess.

CASE I.—N. F. Martin, aged 44, miner, entered the hospital on February 10, 1892. Well until five months before, when he had an attack of pain in the right iliac region without chills or noticeable fever. He did not take to bed, and was kept from work only one day. Two week later the same pain returned. and this time it lasted several days. He said it came with a cold, presumably fever, and it was attended by swelling of the abdomen. Since this attack he has done no work because of a constantly increasing weakness with anorexia, and, he thought. a steady though mild fever. About three weeks ago pain came on in the hepatic region, described as a dull ache without tenderness. During the whole five months there was a moderate diarrhœa, at no time bloody. No dyspeptic disturbance. no chills or jaundice. For two or three weeks he had a slight cough.

Physical examination: Somewhat cachectic appearance, considerable anæmia, no jaundice, evening temperature, 100.5°; tongue moist and clean. Examination of the chest showed on the left a normal condition. On the right side there was flat-

ness below a line extending from the spine slightly upward and outward across the middle of the scapula to the upper axilla, from which it dropped in front so as to reach the sternum at its junction with the fifth rib. Above this line resonance was slightly tympanitic, with normal respiration; below, the latter was somewhat bronchial for a considerable distance, while vocal fremitus was little, if at all, diminished. The heart was displaced about ½-inch to the left. There was some fullness of the chest-wall, with a localized œdema over the lateral aspect of the liver, and the lower border of the latter projected about three inches below the free margin of the ribs in the mammary line. It was even, and tender on pressure. Although the upper line of flatness corresponded very closely with the "S" curve of pleuritic effusion, my diagnosis was hepatic or subphrenic abscess, and I attributed this high line of flatness and the cardiac displacement to an upward pressure of the diaphragm. In this I was mistaken; for exploratory puncture, first in the seventh interspace behind and in the sixth in front gave serum, while a third puncture in the eighth in front gave a thick, light-reddish, apparently purulent fluid. It was, of course, now evident that we had to deal with an hepatic abscess, complicated by a secondary pleuritic effusion.

Since the present paper deals solely with the diagnosis of hepatic abscess, I will only take from the records the following data as regards the subsequent history of this patient:

On February 12, two days after admission, I aspirated the abscess, going in twice to the depth of four or five inches in the eighth space between the mammary and axillary line. About one ounce of the same reddish fluid was obtained. This procedure, although done with all possible antiseptic precautions, was the apparent cause of an acute localized peritonitis, which for a few days seriously jeopardized the patient's life. He passed safely through it, however, and on March 1, nineteen days later, aspiration was again performed by Dr. E. J. A. Rogers, and about a quart of the same stuff as before withdrawn. The opening was then enlarged, a drainage tube inserted, and from this time the patient went on to complete recovery, the pleuritic effusion being absorbed without operative interference.

CASE II.—Antonio Conti, aged 50, was admitted to the hospital on January 11, 1895. Spoke no English, hence no history could be obtained. We could only learn that he was apparently well until three months before, when for a week he had a bloody diarrhœa, with vomiting. Upon admission his chief complaint was of pain in the epigastrium and along lower border of ribs behind. Not confined strictly to bed; appetite fair, with slight digestive disturbance, and a moderate diarrhœa.

Physical examination: Temperature, 100°; pulse, 96; respiration, 22. Great emaciation, color decidedly anæmic and muddy without cachexia. There was no œdema. Heart and lungs negative except a moderate condition of emphysema. Spleen enlarged to about double normal size. Abdomen not distended and otherwise negative except in its relation to the liver. The liver was very considerably enlarged. Though its lower border could not be felt, percussion showed that it extended nearly two inches below the margin of the ribs in the mammary line. There was marked spasmodic contraction of the right rectus muscle, and the epigastrium was tense and quite painful on pressure. It seemed as if the lower border of the liver bulged downward in the epigastrium, and the liver flatness extended farther to the left than normal. The most noticeable feature of the hepatic enlargement was its extension upward. The upper border of the liver was found at the fifth instead of the sixth rib, in the mammary line, extending around to the spine in a nearly horizontal line which behind was also about two inches higher than normal. There was no jaundice, and the urine was negative.

The above examination was not made until the patient had been several days in the hospital, and it lead to the diagnosis of probable abscess of the liver. The temperature had meanwhile been irregular, varying between normal and 100 degrees; but it had now begun to assume the hectic type. There were no chills or jaundice, and the liver remained as before; the epigastric tenderness and upward enlargement without apparent cause of displacement still being the noticeable features of the case. The history of apparent dysentery was also a suggestive factor in diagnosis. No operation was, however, considered at this

time, because of the absence of any exact indication as to the seat of the supposed abscess, and the doubt even as to whether there was a single abscess or multiple small foci of suppuration.

During the month of February, the patient grew progressively weaker, and a pretty steady hectic was maintained, the temperature averaging about 102 degrees P. M., and in the morning dropping to normal. The area of hepatic flatness continued to extend upward, until, on March 1, it had reached the fourth rib. Its upper border was even and regular. Otherwise, with the exception of anorexia and a troublesome diarrhœa, both the general and local conditions showed no change.

About the first of March, however, jaundice appeared for the first time, and with it rigors. From now on, until his death on March 10, rigors were frequent, and jaundice became quite intense. About the same time œdema of the feet appeared, and also a moderate ascites. In the last two or three days friction was found at the base of the right back, and death occurred from exhaustion on March 10.

The autopsy was made by Dr. Freeman on the following day. The abdomen was filled with straw-colored fluid. Spleen considerably enlarged, with evidence of recent perisplenitis. In the liver was a large abscess situated between the two lobes, near the convexity, and containing a pint of pus. Signs of fresh pleurisy were found on the right side of the chest.

Case III.—Anna Pierson, aged 19, entered the hospital February 5, 1895. There was a doubtful history of past syphilis—patient thought she had had a "bad disease" and there had been eruptions on the feet and legs. Three years before she had been treated in the County Hospital for pelvic peritonitis.

For the past two months had been feeling poorly, though not confined to bed. There had been malaise, chilly fevers in the afternoon followed by fever, and irregularity of the bowels with small but often frequent movements. Her chief complaint on entrance was of great tenderness, and some pain over the region of the liver.

Physical examination showed fair nutrition. Confined to bed but did not appear to be very ill. Tongue moist, with

thick, white coat. T., 103; P., 100; R., 24. Urine contained moderate quantity of albumen, without casts, was acid, and had a specific gravity of 10.10.

The heart and lungs were negative, spleen apparently enlarged. Abdomen not distended, and without rose spots. There was no pelvic tenderness. The free margin of the liver was exceedingly sensitive to pressure, and extended about an inch below the costal edge. The upper margin of liver flatness was at the fourth interspace in the mammary line, at least two inches higher than normal, without any sufficient cause for upward displacement. It was even and regular.

Without giving a daily report of the progress of this case, I will simply say that up to her death, on the 20th of March, about six weeks after admission, no new symptoms of importance developed, with the exception that at one time some blood was found in the rather thin and frequent stools. Her temperature during nearly the whole of the period was pretty regularly 102 to 103 degrees in the afternoon and below 100 in the morning. Tongue remained moist throughout, and there were no rose spots, abdominal distention, or tenderness, except when the edge of the liver was touched; this always provoked an expression of pain. The upward growth of the liver increased somewhat, but it was symmetrical. The spleen became easily felt. Until after operation, patient was, as a rule, rather stupid, but continued in fairly good general condition and strength, though it was apparent that the constant fever was slowly wearing her out.

My first thought as to the diagnosis of this case was of hepatic suppuration. In a few days, however, the enlarged spleen, constant fever, and moderate diarrhœa, lead to the presumption of typhoid, and this diagnosis was moderately satisfactory for a time. Since, however, the fever showed no signs of abating, and the hepatic tenderness and enlargement became more pronounced as the case advanced, I soon began to doubt the correctness of the diagnosis, and the question of hepatic abscess again arose. About March 17 a consultation was held with Drs. McLaughlin and Rogers, and an exploratory puncture of the liver was considered advisable. This was done by Dr.

Rogers in several different regions of the hepatic area on March 20, but with a negative result. The operation had, apparently, no harmful effect, but the patient was already weak, and six days later she sank into a condition of collapse and died.

Unfortunately the record of the autopsy, as dictated by Dr. Freeman, was lost. I was, however, present at the examination and the only pathological condition of importance we could discover was in connection with the liver. The latter was markedly enlarged, chiefly upwards, and it was amyloid. It was surrounded and bound to the thoracic wall by a dense mass of fibrous tissue, the result of old perihepatitis. There were also areas of fresh perihepatitis, with recently exuded lymph. The kidneys were also slightly amyloid. There was no suppuration in the liver.

It may prove of interest and profit to base upon these cases a brief consideration of the important points of diagnosis of abscess of the liver. While the disease is by no means common, my own experience would indicate that it is liable to be encountered.

As you are all aware, hepatic suppuration, aside from traumatic abscesses, usually occurs in one of three forms: 1.—As the so-called solitary or tropical abscess, most frequent in hot climates, but occurring also in temperate zones, where it follows often upon an attack of dysentery. Its frequent cause is the amœba coli, which has recently been found in a considerable proportion of solitary abscesses. 2.—Suppuration of the gall ducts or suppurative cholangitis, associated oftenest with gall stones and permanent obstruction. 3.—Multiple abscesses, occurring in connection with infected emboli, which lodge in branches of the portal vein or hepatic artery, and oftenest secondary to some form of intestinal ulceration.

Bearing in mind, then, the fact that hepatic suppuration is nearly always a secondary infection, it will at once be evident that the etiological factor is of prime importance in diagnosis. I know of no disease in which the recent history of the patient should be more carefully elicited and weighed than in suspected abscess of the liver. In the first of the above cases there had been, both a long-continued diarrhœa and symptoms suggestive

of appendicitis. In the second there was quite a clear history of dysentery. While, in the third, the one of mistaken diagnosis, there was only a history of syphilis, and the disease from which she died proved finally to have been of syphilitic character.

A rational symptom of great constancy is pain over the hepatic region, which may or may not radiate into the shoulder. There are a great variety of affections which may be attended by pain in the region of the liver, but if it be borne in mind that hepatic abscess is usually a subacute, sometimes almost chronic disease, many of these can be readily eliminated. Empyema, subphrenic abscess, perihepatitis, and cancer of the liver are perhaps the most important of the disease to be carefully considered, and this can be more profitably done after physical examination.

The same may be said of hepatic tenderness, as indicated by palpation of the free margin of the liver. Although cases have been reported where all tenderness was lacking, in the great majority of instances the organ will be exquisitely sensitive to pressure, and other signs would have to be exceptionably unequivocal to warrant a diagnosis of abscess in the absence of this symptom. Perihepatitis may cause a like tenderness, but is not often accompanied by a steady hectic. The tenderness of cancer is much less pronounced indeed, often absent; and I have never seen it to any marked degree with affections of the pleura.

A hectic fever nearly always attends the development of hepatic abscess, the usual range of temperature being perhaps between 100° and 102° Fahr. It is stated that fever may be wholly lacking. Such a case would be extremely difficult to diagnosis in the absence of tumor, and is fortunately of rare occurrence. Every diagnostician of experience will appreciate the great weight to be attached in hepatic abscess, as elsewhere, to a temperature chart suggesting suppuration, and it must certainly be accorded a high rank among the physical signs of this disease.

Of the importance of a perceptible bulging of the ribs, or a palpable tumor connected with the liver, it is unnecessary to

speak. The diagnosis is at once narrowed down to suppurating echinococcus, empyema of the gall bladder, or, possibly, of the pleura, cancer of the liver, and hepatic abscess. The gall bladder can usually be distinguished by its position and form. Cancer is not a febrile affection, and the nodular infiltration is usually diffuse. Echinococcus may be suggested by other round, hard tumors of the abdomen, or it may not be possible to exclude it until the contents of the abscess have been removed. Usually the diagnosis of an hepatic abscess which has produced a local bulging with superficial œdema or a palpable fluctuating tumor is comparatively easy.

It is, however, exceedingly desirable to make at least a probable diagnosis before this stage is reached and when the chances of operative interference are most hopeful. This, I am convinced, can frequently be done by the aid of a careful physical examination of the liver, guided by a knowledge of the exact conditions to be looked for. The three cases above cited are, it seems to me, of some slight value to this end, both as conforming the experience of other observers, and also as suggesting a possible source of fallacy.

In the first case there was found, first, a line of flatness over the right chest, presenting approximately the letter of "S" curve and therefore strongly suggestive of pleural effusion. Second, a slight displacement of the heart toward the left, still further pointing to effusion. Third, inferior border of the liver nearly three inches below its normal position. That this could not be a simple displacement of the liver was obvious. A presumable pleural effusion only reaching the middle of the scapula and but very slightly displacing the heart could not possibly account for any such degree of displacement of the liver. On the other hand, it is well known that both hepatic abscess and cancer frequently cause a secondary pleuritis, and everything therefore pointed to hepatic enlargement with secondary pleuritic effusion. Fortunately the diagnosis between cancer and abscess was not difficult because of the slight œdematious bulging over the liver. The only question was between hepatic and subphrenic abscess, a point which was measurably settled by the color of the aspirated fluid.

The second case was still more instructive as regards physical diagnosis. Osler has called especial attention to the significance in solitary abscess of an upward enlargement of the liver, due to the fact that such abscesses frequently occupy the convexity of the organ, and therefore, like any other tumor in that situation, produces an upward bulging. He also points out that owing to this local bulging, the upper line of hepatic flatness is often irregular, presenting perhaps a curve with upward convexity at the spine, which in the axilla drops considerably toward the base of the lung. In our case there was no such curve; the upper border of hepatic flatness was an even horizontal line. It was, however, about two inches higher than normal, and, since displacement was out of the question, the only plausible explanation was that of a local bulging of its convex upper surface. This point was of great weight with me in the diagnosis of this case. The history was, it is true, somewhat suggestive, but there were no chills or jaundice at the time, and there was no tumor. The hectic fever, the hepatic pain and tenderness, and this upper enlargement, were the three symptoms which led to an early diagnosis some six weeks before death. Unfortunately this did not benefit the patient. I blame myself severely for not having proposed an operation at the outset. The question was brought up later in consultation with Dr. McLauthlin, but it was then deemed inadvisable because of the great weakness of the patient, and the doubt as to whether the suppuration was not multiple. With my present knowledge, I think this upward enlargement should have been regarded as strong presumptive evidence of solitary abscess. I would not, of course, go so far as to affirm that a symmetrical upward extension of the area of hepatic flatness is an unequivocal sign of abscess or new growth. It cannot possibly have the diagnostic significance of an irregular line as described by Osler. I do think, however, that when pronounced, it has a very considerable diagnostic importance. It is a well-established fact that unless the liver is adherent to the thoracic wall, general enlargement of the organ, as, for example, amyloid, causes usually an extension of the liver flatness downward, and but little, if at all, upward. As far as I am aware, in the absence of upward

displacement and of hepatic adhesions, there can be no cause for a position of the upper border of the liver at, for instance. the fourth rib in the mammary line, other than sub-phrenic abscess or some local tumor of the convexity of the liver. That an enlarged and adherent organ may produce the same physical sign is illustrated by the third case above reported. There also we had hectic fever, painful and tender liver, and both upward and downward enlargement. With Case II still under observation, the impression upon me was strong that I had to do here also with a case of hepatic abscess. This proved to be an error. A combination of old adhesions and fresh perihepatitis, with amyloid enlargement and a peculiar condition of the interalveolar connective tissue, which I may report at another time, explained fully the pain and tenderness, with the usual upward extension of flatness. The fever, however, was not satisfactorily explained, even by the post-mortem examination, and it is for this reason especially that I hope to give still further study to the microscopical appearance of the liver structure in this case. I will merely remind you that the case was syphilitic, and it might well be borne in mind in dealing with a suspected hepatic suppuration.

One word more in regard to the possibility of confounding abscess of the liver with empyema, a matter often referred to and emphasized by writers. It seems to me that many of the mistakes have been made because of the persistence of the old idea that fluid in the pleural cavity assumes nearly a horizontal level. When the upper margin of flatness extends horizontally around the side, say at the level of the fourth interspace, there should be but little thought of effusion. Such a trio would almost invariably be the diaphragm, and could only be due to effusion when the latter chanced to be encapsulated by a horizontally adherent lung. The same would be true of the more extreme cases of upward bulging of the diaphragm such as have been described by Leyden as pyo-pneumothorax subphrenicus, cases in which there is a collection of pus and air between the diaphragm and liver. Leyden has found flatness in these cases as high as the third rib in front, and the same high position of the diaphragm has been met with in simple subphrenic abscess.

An empyema would never present a horizontal line of flatness at the third rib. There is, on the contrary, in very large effusion, a curve with upward concavity which, leaving the sternum at say, the third rib, passes outward and then sharply upward so as to intersect the clavicle. In the empyema, therefore, reaching the third rib, we have a far greater compression of the lung, and hence bronchial respiration above the line of flatness, while in Leyden's cases good vesicular respiration was heard everywhere above this line. Another important point of distinction, also emphasized by Leyden, is the relative degree of displacement of heart and liver. In moderate empyema we find both somewhat displaced; in any affection crowding up the diaphragm to the third and fourth ribs, the apex of the heart is nearly in its normal position, while the liver is pushed downward in a degree out of all proportion to the slight displacement of heart and mediastinum.

These, then, are the conclusions which I must venture to suggest from the study of these few and imperfectly reported cases:—that with hectic emaciation and hepatic pain and tenderness, an upward enlargement of the liver, even though symmetrical, affords strong confirmatory evidence of abscess; and that, at the same time, just such a complex of symptoms may be caused by a syphilitic affection of the liver, combining the pathological conditions of perihepatitis, amyloid degeneration, and possibly also a form of syphilitic hepatitis capable of producing continued fever and not yet hitherto perfectly described.

DISCUSSION.

DR. MCLAUTHLIN: These are very interesting cases of abscess of the liver, and it would seem that the disease is perhaps more common than would be supposed from our text-books. Certainly at the County Hospital we see a number of cases each year, and I have seen at least two cases outside of hospital work. In connection with the diagnosis of the liver, I want to mention a pamphlet written by Dr. Osler and published by Appleton, on the diagnosis of abdominal tumors. The author goes into the subject so fully, and brings out so many practical points in

diagnosis and differentiation, that you will find it of great interest.

DR. HARRISON: I think abscess of the liver is a very rare occurrence in this or any non-malarial district. South of this, where we have a vast growth of vegetation and decay of the same, abscess of the liver is a frequent occurrence, especially in the low, marshy, malarial districts of the Mississippi Valley. The experience of myself in this country in reference to abscess of the liver is, that it is of frequent occurrence in the localities and vicinities where we have had hematuria, abscess of the liver following in about 80 per cent. of the cases of genuine hematuria, with all of the characteristic features of pigment bile of the liver. We find the districts of the Rocky Mountains, and the valleys have had two or three, I might say, epidemics of hematuria. I know of no way to account for it. It really was not an epidemic, and yet might be classed in that manner; for instance, at Villa Grove and Aspen, in a certain locality there, along near the line of the markets and railroads, where vegetables were shipped in, and dumped and thrown out in the alleys and gutters, and were allowed to decay there, we had a great amount of disordered conditions of the liver, hematuria and abscess of the liver following the same. We have had a few cases of hematuria in Victor mining camp, and Wilson Creek district. About seven cases came under my knowledge, and out of seven cases, I had three of abscess of the liver. I know of nothing to add to the characteristic features of diagnosis, which Dr. Whitney has so intelligently placed before this body. It is in keeping with the best authors and most skilful men we have. The only thing that I have to say in regard to treatment is, the early drainage, of which Dr. Whitney has spoken, and the free administration of calomel and hyposulphite of soda.

MAL-ASSIMILATION.

W. L. DORLAND, M. D., PUEBLO, COLO.

As an introduction to the brief consideration of this subject, I wish to present two or three familiar clinical pictures, in order to attract attention to an abnormal condition which is be-

ginning of late to receive the thought and investigation it deserves as an etiological factor in many disorders to which flesh is heir.

This patient gives his age as 35, though he looks ten years older. He complains of pain in all his limbs, his loss of appetite is complete, his eyes are lustreless, his haggard countenance presents the appearance of profound anæmia. He says that he has lost one-fifth of his weight in the past year. He is obstinately constipated. He has severe attacks of colic at intervals; his abdomen is hard and retracted; his tongue has a dark, heavy coat; mouth dry, breath offensive, and of a peculiar metallic odor; his pulse is slow and soft; temperature normal or below, and on the edges of his pale gums there is a deep blue border. He can not raise his hands promptly, from paralysis of the common extensor muscles. We find that he has worked for years in a smelter, and the diagnosis is complete. It is an average case of plumbism; profound intoxication with the poison of lead, which he has absorbed for years, in his environment, through his mucous surfaces and skin, and the physician who has the care of hundreds of these individuals from year to year well knows that the only variations from this average, are due to the variations in the susceptibility of the individual to poison.

Another case: We are summoned to the bed-side of a woman who has for more or less time been laboring under a strange malady. We find a condition of great debility, loss of appetite, pains in chest, conjunctivitis, great gastric irritation or diarrhœa, impaired muscular power, or perhaps actual paralysis of lower extremities; a vesicular eruption on neck, scalp or hands, progressive emaciation, nervous prostration which may end in convulsions. These are the salient symptoms of arsenical poisoning. We may find that a lotion containing the drug has been used persistently; a systematic attempt on the life of the patient may be thus detected, or the walls of the close room may be covered with arsenically prepared wall-paper. When the case yields to treatment, we know beyond a doubt that had these symptoms failed of recognition and treatment, a fatal termination would have been inevitable.

These are typical instances of familiar forms of poisoning, which are comparatively easy of recognition; but let me present another: This patient walked into my office some eight years ago. He presented the appearance of a prematurely old man; stoop-shouldered, feeble, walking with a cane. Of dark, sallow complexion, skin and conjunctivæ slightly yellow. As he sat down a loud belching of stomachal gas afforded me a diagnostic pointer. He complained of habitual constipation, capricious appetite, constant bitter taste in mouth. frequent headache and vertigo, great depression of spirits, general malaise. His pulse soft, slow and irregular, heart and lungs in normal condition, liver of normal outline (perhaps slightly enlarged), though slightly tender on strong percussion. Abdomen but little distended, though tympanitic over the stomach. Urine of darker color than normal; reaction acid, sp. gr. 1034. No albumin, no sugar, copious deposit of urates. Two years previously he had made his fortune in selling his mines; and, having made discreet investments in paying property, was at liberty to attend to the condition of his health, as he felt that he had but a few years to live. He had led the usual rugged life of the miner and prospector; living on the tough diet of the mountain camp. Fresh baking-powder biscuit, bacon, and canned fruit, with strong coffee, had been his daily diet for fifteen years. Believing that in the multitude of counsel there is safety, after taking the advice of his neighbors, he proceeded to consult many noted specialists, and visit many of the sanitaria and health resorts of the country. It was truly astonishing to hear the details and read the prescriptions with which he was loaded. The various specialists had treated him according to his light. His nasal cavities had been cauterized, his stomach had been washed again and again; his rectum had been explored and piles removed; he had been operated upon for fistula in ano; a floating kidney had been discovered, which he had declined to have permanently anchored.

Cirrhosis of the liver had also been diagnosed, and his expectancy of life limited to a year. During the next four years, under the most careful regulation of diet and mode of life, varied with an occasional trip to some newly discovered sanitary

resort, where he would remain for more or less time, it seemed to me his condition was about stationary. But in the last four years there has been a slow but steady improvement. The icteric hue has disappeared; though now habitually careful of his diet, he enjoys life again; his weight has increased twenty pounds, his tongue is clean, his eyes are clear, and the ruddy color of health shows upon his cheeks. Careful examination reveals no degeneration of any organ, and he is again in active business, promising to live many years.

This has been a case of chronic gastro-duodenal catarrh, chronic biliousness, chronic congestion of the liver, chronic subacute gastritis. All these names have been applied to this condition which was the result of long years of bad diet and exposure, to which, had not the individual been the possessor of a remarkably vigorous vitality and heredity, he would long ago have succumbed. The inception, career, and ultimate consequences of mal-assimilation, until the past few brilliant years of medical and pathological research, have usually been charged to the liver. "Is life worth living?" says the dyspeptic poet; "That depends upon the liver," replies the old doctor. We are living in a golden age of medical science: an army of investigators in the laboratories of the world are detecting and identifying the causes of disease, their origin and method of transmission; their prevention or destruction.

Fifteen years ago Fothergill in his lucid, interesting little book on "Indigestion and Biliousness," alluded to the subject thus: "We may suffer from that form of indigestion known as biliousness, either from the imperfect elaboration of the products of digestion in the alimentary canal, or from imperfection in the filtering process in the liver, which prevents the escape of peptones into the general circulation. In either case the system is badly nourished and at the same time poisoned by the want of certain constituents and the presence of others in the blood. And now and then, a scrap of literature on the subject finds its way to public notice, indicating that the trend of medical thought points this way. Last year there appeared a volume of lectures on this subject by Professor Bouchard, of Paris, which is attracting universal interest. In

these lectures he demonstrates clearly that man is both a receptacle and laboratory of poisons. He receives them in his food; he creates them by mal-assimilation; he forms them in his secretions. The human body is the laboratory in which poisons are constantly developed by the normal microbes which inhabit the alimentary canal. And yet man is not poisoned, he is defended in various ways against poisoning. In the first place the liver protects him by arresting on their way the poisons brought from the intestines by the portal system, in order to neutralize them, or throw them back into the bowel before they pass into the blood. The excretory system expels the poisons which are in the circulation. This is not theoretical, but Bouchard has demonstrated it by many careful experiments, taking the natural products of excretion and injecting them into the veins of living animals. Having determined the weight of living animal matter that can be killed by the poison which each kilogram of the body of a healthy man supplies daily to the urine, he possessed a standard which enabled him to study the variations of intensity of the urinary poison under different physiological and pathological conditions. He demonstrates that the urine, at least, contains seven poisonous substances. Urea, the normal diuretic; a narcotic substance, a substance that produces salivation, one that contracts the pupil; one that lowers the temperature, and two convulsive substances, one of an organic nature, the other mineral. The urine is poisonous because all these substances are carried away through it. They come from the blood and man escapes. As these poisons are continually passing through the blood on their way to the emunctories, the blood must contain toxic matter in a small degree continually, but not sufficient to affect the system unless the balance be disturbed to the extent of ten times the normal quantity. Thus is afforded an explanation of the different forms of intoxication termed uraemic, and he gives convincing proof by many experiments that the urine of uræmic patients is not poisonous, owing to the presence of its non-eliminated poisons in the blood. Bile also contains poison which lies mainly in the coloring matter, and as Fothergill said, "goes together with the bile acids." The kidney continually eliminates

the bile-acids and does its best with the acids as they are more or less perfectly oxidized. The cellular and white fibrous tissues retain the excess of coloring matter, giving rise to the icteric hue. The biliary salts also increase mal-assimilation, destroy muscular fibre and blood corpuscles, and thus set free organic and mineral poisons. If the liver, whose normal function is to protect the system against the intestinal poisons, is diseased or hindered in its function, this protection is impaired, and its power of forming urea from the disintegration of albuminoids diminished. Urea being the direct stimulant to the kidney function which carries away the other poisons with it, when thus it ceases to be supplied for this purpose, the condition known as cholaemia or uraemia ensues. In jaundice, the true safeguard against poisoning is the kidney. As long as its function is intact the urine is very toxic, not alone with bile but with the products of mal-assimilation. Interfere with the function of the kidney, and the urine ceases to be toxic and the patient is poisoned with the retention of the normal poisons.

The alimentary canal is a very important source of poisons. It contains, in addition to the poisonous residue from various foods and the bile, in the condition of mal-assimilation, the products of intestinal putrefaction, to which Bouchard has given much experimental study. He has shown that several kinds of alkaloids exist in fæcal matter, and that when one variety predominates in the bowel he finds them largely in the urine. He has shown that intestinal antiseptic treatment, which causes the alkaloids to disappear from fæcal matter, diminishes the toxicity of both. The infectious nature of typhoid fever is questioned by him—not seriously, however, but the fact is demonstrated beyond a doubt that the most virulent cases are those in which by a pre-existence of this condition of auto-intoxication, the system is enfeebled, and the power of resistance to an additional microbe reduced to a minimum. And the most successful treatment is that in which the sterilization of the alimentary canal is persistently followed from start to convalescence, thus preventing fresh putrefaction, and destroying the poisonous alkaloids in that which is already under way. For the healthy man is not attractive to the microbe; almost constantly invaded

by infectious agents, he reacts against them, and so generally keeps uppermost that the disease does not even become apparent. A vast majority of the cases cited by Bouchard in his lectures are accompanied by dilatation of the stomach. This implies that this abnormal condition originates in primary indigestion, in retardation of the supply of gastric fluid, which allows the development of abnormal fermentation, which developes the gas which stretches the viscus, prevents the normal peristaltic action, hinders the elaboration of peptones for the secondary action of the liver, until partial putrefaction begins.

This is an immense subject, far too broad for more than a superficial glance at the vastness of its practical interest here, but it contains self-evident truths, which are so convincing that we feel that here and here alone is the true foundation for rational medicine.

DISCUSSION.

DR. AXTELL: The subject presented by Dr. Dorland is certainly one of great interest to every physician. All of us see many cases of mal-assimilation due to improper digestive power on the part of the stomach and the intestines. In my limited dispensary practice I have attained a little local reputation in the treatment of these diseases, having many of them at present under my care. The treatment of this trouble has some good points, it seems to me, and while a very old one, I should like to dwell upon it for a few moments. The patient in every instance is instructed to take hot water an hour before meals; that is an old treatment, certainly. Immediately before the meal is begun the patient is instructed to take as much subnitrate of bismuth as will go on a nickel. In this trouble of mal-assimilation the salivary digestion is one that is not given as much attention, probably, as it should have. For about twenty minutes after food is taken the salivary digestion goes on in the stomach, and it requires an alkaline medium for it to be successfully carried on. If the stomach is acid, this salivary digestion does not go on. The patient is instructed as to the food necessary to be taken, what food the patient should take and should avoid as well as we can lay down laws in that matter, and twenty minutes after the meal has been taken, dilute

hydrochloric acid is taken. Certainly the treatment is not new, but it has given results in these cases which sometimes are surprising. The trouble in these cases of mal-assimilation many times is that the hydrochloric acid of the stomach is absent. Pepsin requires an acid medium for the due performance of its functions, and by introducing the acid into the stomach at that time, we help the pepsin present to convert albuminoids into peptones. It is true that this simple treatment will not work in every case. Many other things have to be tried. In one case the patient was put upon peptonized milk for two weeks, before this treatment did any good whatever. After the rest of the stomach by peptonized milk for two weeks this treatment was instituted, and did a very great deal of good. The doctor has laid stress upon the antiseptic treatment in these cases. Hydrochloric acid is a fair antiseptic, and introduced in this way, frequently kills many of the germs which produce the various acetic, butyric and lactic acids which result from fermentative processes going on in the stomach. When I find that hydrochloric acid is not strong enough to make the stomach antiseptic, to relieve the formation of gases within the stomach I am in the habit of prescribing creosote, which certainly is of very excellent service in cases of fermentative dyspepsia.

DR. CROUCH: The remarks of the preceding speaker have suggested to me that possibly in such cases, it is best first to make a diagnosis before starting on a treatment. In the diagnosis it is well to make some examination of the contents of the stomach before giving hydrochloric acid or alkalies. If you have, for instance, a condition of hyper-acidity, a small amount of alkali will have very little effect, and then anything tending to acidity afterwards would certainly not be adopted. So in reference to the power of the hydrochloric acid to produce antisepsis. It is comparatively small for the amount of the hydrochloric acid given, with very little effect in these cases.

DR. DORLAND: I am very much obliged to the gentlemen for supplementing my paper. This is one of the most important subjects in the science of medicine; one worthy of much thoughtful consideration. In the last ten or fifteen years,

since the development of so much chemico-physiological work, it has made remarkable strides, and the fact is evident that all these remedies most useful in cases in which mal-assimilation is a feature, are more or less of an antiseptic nature. The scientific treatment of secondary indigestion or mal-assimilation is one far too long for one paper, and as our time was limited, I endeavored to outline the subject as well as I could, in brief, trusting that the subsequent discussion would more fully treat it.

DILATATION OF THE STOMACH.

H. C. CROUCH, M. D., DENVER, COLO.

Among the various pathological conditions of the stomach, one frequently wrongly diagnosticated, and even more frequently failing to meet the recognition of cause and consequences, is that known as dilatation. Any effort to bring more clearness into a subject by no means necessarily so obscure as it seems at present, appears to me to require no further justification, and although I have very little to present that is actually new, nevertheless some of the results of the more accurate methods of diagnosis in diseases of the stomach are sufficiently unfamiliar as to have as yet failed to find their place in the general works on medicine.

Dilatation, as a word, would seem to be self-explanatory. As a clinical entity, it requires much explanation. Any enlargement of the capacity of the stomach might seem to justify the term dilatation. Apart from the fact that an increase in capacity may be very apparent, and yet be absolutely outside of the pathological, it may be remarked at the outset that the important factor in the conditions usually diagnosed as dilatation is not the dilatation at all, but stagnation, and as this is the one important fact in conditions which often differ widely in cause, and more widely still in dignity, we might do well to banish altogether the term dilatation, as representing a morbid entity. In fact, Boas, in the last edition of his treatise, has actually done this. However, as Klemperer remarks, it is difficult to

banish a term so generally accepted, and which presents certain conveniences, so that if we are still obliged to use it, we may at least insist upon a more exact definition of the clinical meaning. and an emphasis of the fact that it is only a symptom, important only as associated with other things. Let us, then, endeavor to define the clinical meaning of dilatation. When, from any cause, food and liquors cease to pass from the stomach at the proper time, or with sufficient rapidity or completeness, they stagnate and accumulate, producing an enlargement and distension of the organ, and this condition we recognize as dilatation. A very little consideration suffices to realize that stagnation is the important fact, and that only by recognizing its presence are we enabled to differentiate between a pathological dilatation and other conditions where the capacity of the stomach is increased, but which do not constitute a source of such serious harm to the organism. In fact, we may sometimes have a high degree of stagnation, producing all the phenomena associated with dilatation, in a stomach not as yet enlarged, and which would fail to be recognized as dilatation. Stagnation, then. being the important factor, how do we recognize it, and when is it sufficient to be of importance? If the food at one meal fails to pass from the stomach before another meal is taken, it may be said that there is stagnation. This, however, often occurs when the interval is short. In a longer interval, particularly that between the evening and the morning meal, the stomach empties itself completely, and there is then no permanent stagnation. If, however, even in this interval, the stomach does not become empty, the food stagnates, and the phenomena accompanying dilatation ensue. This, then, we may take as the principle in determining the existence of stagnation. When the stomach is not found empty in the morning, after one ordinary meal taken the night before, there is stagnation, and consequently, in the clinical sense, dilatation—and usually in the mechanical sense as well. In practice this is an extremely important part of the examination. An ordinary test meal of bread, meat and tea is given at the usual time in the evening, and the contents of the stomach, if there be any, are drawn off the following morning. In addition to the information relative

to the motor function, important facts concerning the chemical functions result from such an examination.

Dilatation with stagnation being, as we have remarked, only a symptom, let us examine under what conditions it exists, and first of all, what conditions are not properly speaking, to be classed as dilatations. On ordinary examination, even simple inspection will often show the greater curvature in a position much below the normal. Palpation will demonstrate the position with some accuracy through the sound of succusion or clapotage. On the strength of this, dilatation is often diagnosticated. In dislocation of the stomach, discensus ventriculi, as it occurs most frequently in women who have borne children, and often associated with floating kidney, we frequently find such conditions. The dislocated organ is often very flaccid and somewhat enlarged, and yet in the absence of the cardinal symptoms of stagnation, it would be a grave error to pronounce this dilatation. A condition even more frequently seen is that of muscular atony or myasthenia, and is met with particulary in neurasthenic and phthisical or ex-phthisical patients, the greater curvature reaching the umbilicus or slightly below when the stomach is full. Palpation elicits the sound of clapotage during the whole digestion period, and an examination may further show the presence of food long after the time at which it should normally be discharged. Such cases have been brought to me with the diagnosis of dilatation, and certainly in such cases there is in a strict sense, dilatation Yet during the night the stomach discharges its contents more or less perfectly. The important symptom of permanent stagnation, the source of the grave trouble in pronounced dilatation, is missing, and we must separate this condition as sharply as may be from the clinical picture of dilatation. The difference in gravity of these conditions is obvious, and yet the difference in kind is merely of degree, for conditions of myasthenia may become aggravated so that food is no longer discharged during the night, and we have then a form of dilatation due to stagnation and accompanied with the severer symptoms. the vomiting, the anorexia, the thirst, the emaciation, that make up the clinical picture of dilatation.

Dilatation may be considered due to mechanical insufficiency, the failure of the muscular apparatus of the stomach to discharge the contents completely. It is evident that this may be due either to the inability of the muscular coat to perform normal work, simple myasthenic dilatation, as already mentioned, or it may be due to an increased demand to which a normal muscular apparatus finally has become unequal. The most common cause of such a condition is found in some obstacle, particularly stenosis of the pyloris or duodenum either circatricial or consequent on some tumor, malignant or otherwise.

The determination of the nature of ditatation is of immense importance in reference to treatment. Above all, the question of surgical interference is to be taken into consideration in suitable cases, and such cases are constituted by conditions of stenosis and tumors. Particularly in cicatricial stenosis, the results of a well performed operation are among the most brilliant in abdominal surgery.

An exact diagnosis is consequently of immense practical importance, for in addition to the question of surgical interference, appropriate treatment is very effective in alleviating and relieving the patient's troubles.

Let us, then, consider briefly the more common conditions, and the means for differentiating. Dilatation is most frequently one of three conditions. In the first place, it may be due to a primary muscular insufficiency, and is what we have referred to as atonic or myasthenic dilatation. In the second place, it may be due to cicatricial stenosis of the pylorus, or, exceptionally, the duodenum, following usually a gastric or duodenal ulcer, or the introduction of corrosive substances. In the next place, it may be due to a tumor of the stomach, ordinarily cancer involving the pylorus. It may be remarked that in this case, both of the factors producing dilatation are at work, viz: a pyloric obstruction and a weakening of the muscular coat; for it is remarkable how early cancer affects the motor function of the stomach. Omitting, for the sake of brevity, the more uncommon conditions, where the obstruction is constituted by a tumor or inflammatory conditions outside of the stomach or

duodenum, the means for differentiating these conditions alone may be considered here. Dilatation is due to carcinoma; the cause is easily enough recognized where there is a palpable tumor, advanced cachexia, the hæmorrhages and other classical symptoms. Unfortunately, such cases are usually hopeless. It is evidently of greater importance to have some means of at least suspecting the existence of malignant disease at an earlier stage. Important information is afforded here by a clinical examination of the contents of the stomach. In simple dilatation, either atonic or due to cicatricial obstruction, the contents show certain peculiarities on inspection. Usually copious, they are always in a condition of fermentation, and in a glass vessel, show a characteristic division in three layers, have a distinctly acid smell, like that of yeast or some beer, and contain hydrochloric acid either in normal, or frequently in more than normal quantities. The contents of the stomach in carcinomatous dilatation are undergoing a decomposition rather than simple fermentation, are often offensive to the smell, and show either a very low amount or no hydrochloric acid at all. Of value, especially in the earlier stages, is the presence of lactic acid, the importance of which in the diagnosis of carcinoma was first recognized by Boas. Contrary to the usual teaching, lactic acid, except as introduced in the food, is at no time present in the stomach in appreciable quantities. Lactic-acid fermentation, to produce appreciable quantities of lactic acid in the stomach, requires two factors, the absence of hydrochloric acid, and stagnation, both of which occur so much more frequently in cancer than in any other condition, that practically the presence of lactic acid, when the proper precautions have been taken, justifies a strong suspicion of cancer. It is necessary, in the first place, to select for the test meal a substance free from lactic acid. This, in accordance with the practice of Boas, is oatmeal-gruel. The stomach is thoroughly washed out, the test meal of oatmeal is given in the evening, the contents of the stomach examined the next morning for lactic acid, either by the Uffelmann reaction, or, in doubtful cases, by Boas' aldehyde test. While the absence of lactic acid does not necessarily exclude cancer, the presence of

lactic acid is very strong presumptive evidence of its existence. Microscopically, the abundance of sarcinæ and yeast in non-malignant dilatation, their greater rarity and the presence of long zig-zag-shaped bacilli, confirm the chemical examination. In addition, the course of the disease, the age of the patient, the existence of fugacious œdema, assist in the differentiation.

It being possible in the majority of cases to distinguish between malignant and non-malignant dilatation, it remains to ask whether we can distinguish with equal certainty between ideopathic myasthenic dilatation, and that secondary to a stenosis. It must be admitted that this is a most difficult problem. There are, however, certain points which materially aid in its solution. The history is important. The principal occasion of non-malignant stenosis of the pylorous being a precedent ulcer, a history pointing to such a condition, hamatemesis, tarry passages, a circumscribed pain, which may likewise be present long after the ulcer is healed, would indicate a cicatricial stenosis. A greatly exaggerated and visible peristalstis is, when it is present, suggestive of an obstacle at the pylorus. In a certain number of cases, careful palpation may discover the cicatrical enlargement, or bands of retracting tissue. The course of the disease is somewhat different. In myasthenia it is long in developing, there are frequent remissions, the degree of dilatation is less, and the response to treatment more prompt. Possibly this last condition is of the most value, for when a rational treatment fails, the question of surgical interference must be raised, and in such a case an operation would be equally indicated in very severe myasthemic dilatation, and in cicatricial stenosis.

A few words in reference to the treatment of dilatation. It is not my intention to go into the treatment at length. It may only be observed that washing out the stomach, a proceeding so often unneccesarily employed, and in fact so very often misused, finds here its principal field of usefulness. I have wished, however, to emphasize the surgical aspect of dilatation and the necessity for an early consideration of operative interference in all suitable cases. Even in cancer, where a radical operation may be hopeless, the relief afforded by gastro-enterostomy is so

great that it is to be recommended in all cases of pyloric obstruction. The improved technique has made the operation of gastro-enterostomy in skilled hands one of the simplest of abdominal operations, and the reports from more recent operations by Hahm, Koecher, Murphy and others give brilliant results. In carcinoma particularly with pyloric obstruction, the advisability of the operation can not be dwelt upon with too much emphasis. A permanent relief from the most painful symptom of stagnation, a prolongation of life, ending in an easy and painless death, a fading away, as it were, instead of a prolonged agony—these more than justify such an operation.

DISCUSSION.

DR. DORLAND: I have listened with great interest to the reading of this paper. I think it should have preceded mine, as they are in some degree supplementary to each other.

I would like to ask the doctor if he does not think that dilatation of the stomach is caused by its continual distention by the gases evolved from the retrograde processes following retarded digestion or decomposition of the stomachal contents?

In this condition of myasthenia with dilatation, and subsequent mal-nutrition, I have found great benefit from the long-continued and liberal use of strychnia in restoring the nutrition of the muscular wall of the stomach, thus assisting proper peristalsis, and shortening the period of retarded digestion.

DR. SEWALL: I would like to ask if the range of indications for stomach-washing has ever been defined? So far as my experience goes, the application of lavage is almost purely empirical, and the results I have seen coming from the practice are not easily explainable. I have records of two cases of old syphilis in which the vomiting was intolerable; nothing could be held on the stomach, and the patient lived in misery. The stomach was washed out, and though nothing was brought away, that vomiting ceased immediately, and there was perfect relief. Directed by a definite theory, I have used the stomach-tube for washing in cases of vomiting in the menstrual period, and though lavage in these cases does not commonly remove much material, definite relief is very apt to follow. Our knowl-

edge would be much improved if careful records were made of all cases in which lavage has been used, whatever the therapeutic results.

DR. DAVIS: Stomach washing, like many other methods, is very much abused. And there are some cases in which stomach washing becomes a habit. I remember reading in some journal a little anecdote to illustrate this. For instance, a young physician who came into possession of a stomach tube set out to make himself an expert in the use of it. He offered a boy twenty-five cents if he would come and have his stomach washed out. The boy came up and got his stomach washed out and his twenty-five cents. After the young physician had experimented two or three weeks and had become expert in the use of the tube he told the boy that it was unnecessary for him to come any more. The boy in three or four days had a very strong inclination to have his stomach washed out again, and so he returned to the doctor, and said, "Mr. would you not like to wash out my stomach to-day?" The doctor said, "I don't care to." The boy replied, "I will let you wash it out for nothing if you will." Well, he did, and after two or three days the boy returned to have his stomach washed out again, and kept on coming, begging for the doctor to wash his stomach out. Finally the doctor would'nt do it any more. So the boy stayed away about a week, and then came back, and said, "Won't you wash it out; I will give you a quarter if you do."

That illustrates how a habit may be engendered So far as simple dilatation of the stomach is concerned, the best operation I think, would be simply to abridge the capacity of the stomach by inverting sufficient folds and stitching the peritoneal surfaces together. In this way you do not destroy any of the secretory surfaces of the stomach. As to stenosis of the pylorous, when dilation will not suffice, and you have a malignant or other irremedial cause or condition, then gastro-enterostomy is the procedure.

DR. HARRISON; For the benefit of those brothers that are present and questioning Dr. Crouch, I would say, that if we should stick to the members of the association after the banquet to-night by to-morrow morning they will see the necessity

of washing out the stomach. Mal-assimilation is probably one of the first features of which dilitation is the result, and I do not think too much can be done to produce liquidity of the contents of the stomach in cases of dilatation. My experience, from a hydropathic point of view, is that in chronic drinkers, and especially in beer drinkers, we have dilatation of the stomach and we certainly can wash out the stomach, and not only the stomach, but the system, the same as we can fabric, and one of the great methods of treatment by which I have seen the greatest benefit derived is immersing the patient in a tub of hot water at a temperature of three degrees above that of the animal economy, and allow them to drink water as hot as they will gulp it down and as much as possible, and at the same time turn hot water over the region of the stomach from the pylorous to the cardiac end of the stomach, which revolutionizes the condition, and certainly from these methods great benefit is derived.

DR. CROUCH: In the first place it seems to me that I covered the question of Dr. Dorland in my paper; that is, where the stagnation results from weakness of the muscular coats, stagnation ensues accompanied with fermentation. In the other case there is obstruction to the food with the production of gases, which by distention increases the dilatation. Although the walls were normal, stagnation ensues and dilatation follows.

In reference to the use of strychnine, that is one of the remedies we rely on very largely in simple dilatation. In reference to the use of the stomach tube, you may have a certain standard to direct you. The object is to remove the stagnating contents of the stomach. This would be particularly true where there is stagnation.

In chronic gastritis where there is a large amount of mucus, we may use the tube to remove mucus, particularly, however, making use of medicated water, which will dissolve the mucus somewhat. Then the good effects of the use of the stomach tube, in many other cases, rests largely on what we call suggestion, and in these cases might be advantageously replaced by the stomach douche; that is to say, the stomach tube instead of containing large openings contain, small ones, the

water being introduced under gentle pressure, passing out of the small openings in small sprays, irrigating gently the walls of the stomach, and affording a certain stimulus. In addition to that, we may add certain medications to the water, and that is undoubtedly very effective in certain cases, and is a much more gentle procedure, and more beneficial than washing out the stomach with a tube with large quantities of water.

REPORT OF A CASE OF ADDISON'S DISEASE, WITH REMARKS.

H. W. MCLAUTHLIN, M. D., DENVER, COLO.

Miss Elizabeth H., age 47, white, native of Ireland, lived in Canada before coming to Colorado; occupation, housework; was first admitted to the Arapahoe County Hospital May 31, 1894, under the service of Dr. Henry Sewall. The following history is from the hospital records: "Family history negative. Always well till 20 years of age, when she was sick about three weeks with congestion of the lungs. In 1889, when 42 years of age, she first noticed a discoloration on the forehead, which gradually deepened and spread over the body. She was in bed all that summer" (probably from weakness, although the history does not state). "She suffered from constipation and pain in the lower part of the back. Since that time she has been up and down. The least exertion causes great prostration and pain in the back and sides.

"Physical examination: The face shows a uniform dark discoloration, with areas of much deeper brown. The color is particularly dark and uniform over the neck, forearms and backs of the hands. On the body and lower limbs the color is lighter, but deepens again on the abdomen, over the backs of the hips and the inside of the thighs. The tongue is streaked with dark pigment, especially on the edges, as if she had eaten blackberries. She complained of tenderness over the left chest and the abdomen. Nothing abnormal was found on the lungs. The heart sounds were weak, but otherwise normal. The abdomen flat, with aortic pulsation marked. The lumbar curve of the spine increased."

The urine showed a specific gravity of 1012, reaction alkaline, no albumin.

After remaining in the hospital about five and a half months, she was discharged November 14, 1894, under the service of Dr. S. A. Fisk, the record bearing the inscription, "no change in condition."

During her stay in the hospital the pulse varied between 76 and 98, averaging about 84, the respiration averaging about 21. The temperature chart showed an evening rise of ½ to 1½ degrees during a considerable portion of the time. The bowels were constipated, with occasional attacks of diarrhœa.

She was readmitted to the hospital under my own service, March 24, 1895. At this time she was completely bedridden, while anorexia and vomiting were prominent symptoms. She was much emaciated and extremely weak. The heart-sounds and pulse were very feeble. The pigmentation had become deeper, especially in small spots over the body, and it was particularly marked on the tongue. The urine was slightly alkaline, otherwise normal. The pulse was about 94. In the epigastric region there was a circular area giving dulness on deep percussion, hard and immovable to palpation. This was thought to be connected with the spine She sank continuously, and died April 9, 1895. Two days after death the autopsy was held by Dr. Leonard Freeman, pathologist to the hospital. The record reads as follows:

"The body is that of a white woman; emaciated; post-mortem rigidity and staining marked; age apparently between 55 and 60 years. The skin of the entire body is markedly bronzed, more especially about the hands, arms, neck, face and tongue. The tongue is quite dark in color, while the mucous membrane of the mouth is but slightly altered, excepting a bluish discoloration along the gums. There are a number of small, dark-brown spots, like freckles, scattered over the face and body. The subcutaneous fat is unusually yellow, and over the abdomen is from 1¼ to 1½ inches thick, notwithstanding the emaciation. Owing to a marked bending forward of the vertebræ, a hard projection within the abdominal cavity could be felt externally. The right lung is universally bound with old

adhesions, especially at the apex, where there is a nodular mass of tubercular material, caseous and fibrous in character. The bronchial glands are enlarged and tuberculous. The left lung is also tuberculous. The heart is small and flabby, with dilated vessels; valves negative; no atheroma. The walls of the left ventricle are thin while the heart muscle is firm and very brown in color. The left supra-renal capsule is much atrophied. There is a caseous, slightly calcareous, tubercular nodule, the size of a hazel-nut, at its internal and superior angle; also, a second, small, caseous nodule, the size of a pin's head. Around these nodules there is considerable fibrous thickening of the adjacent tissue, making the deposit adherent to the spine. The right supra-renal capsule is also considerably atrophied, and has two caseated nodules, each about the size of a grain of corn. The left kidney is surrounded by considerable fat, is slightly smaller than normal, the capsule slightly adherent, leaving a finely granular surface; the cortex is thin, about one-fourth the usual thickness. The entire kidney is congested and in a condition of chronic interstitial nephritis. The right kidney is similar, but has more extensive adhesions of the capsule. There is no thickening of the nerves, or tumors of any kind to be found in the region correspoding to the supra-renal capsule. The spleen is slightly enlarged, but otherwise normal. The liver is one-fourth smaller than normal, the edges are slightly rounded, it does not cut readily and is considerably firmer than normal while the color is darker. The gall bladder and ducts present no evident obstruction. The lower few feet of the small intestines are negative. The uterus is small, the ovaries and tubes negative."

Addison first described the disease which bears his name, in 1855. He gave as the general symptoms, anæmia, general weakness, especially a weak heart, together with irritability of the stomach and a discoloration of the skin. These have remained the principal symptoms, excepting that anæmia is no longer placed in the list. That it is a rare disease in America, is shown from the fact that Osler in 1892 had seen only eight cases, including his work at the bed-side and the post-mortem table. Males are about twice as frequently affected as females.

The age is that of young adults, or from twenty to forty years. One congenital case has been described.

In a majority of cases tuberculosis of the capsules, and often of other parts of the body, especially the lungs, is present. In such cases the capsules are thickened and contain cheesy masses encased in thick, fibrous tissue. Blows on the abdomen, or over the kidneys, and caries of the spine have so frequently preceded the beginning of the morbid process in the capsules as to merit an etiological relationship.

Other pathological conditions of the capsules which are sometimes found, are, first, atrophy from interstitial cirrhosis, and, second, maliguant disease. The fibrous thickening which encases the capsules usually extends so as to involve adjacent nerves and ganglia of the abdominal sympathetic system, causing their compression and atrophy.

Based upon the pathological changes mentioned, two theories are advanced to explain the characteristic symptoms of this disease: First, that owing to the function of the adrenals being lost, the system is poisoned by the retention and circulation of some unknown substance which the adrenals should have eliminated or altered. Second, that the symptoms are due to a disease of the abdominal sympathetic system, which is caused generally by disease of the adrenals, but which may also be caused by other chronic diseases, involving the solar plexus and its nerves. In support of this theory is mentioned the pigmentation of the skin seen in tuberculous peritonitis, cancer of the pancreas, abdominal aneurism, and so on.

It seems highly probable, however, that without the adrenal disease the complete group of symptoms characteristic of Addison's disease is never found. It is possible that both explanations of the disease are correct, and that each is concerned in its production. The first symptom to attract attention is generally the pigmentation of the skin. This varies from a light-brown, or smoke color, to black. It is diffused, but is distinctly more marked on the exposed parts of the body, and where pigment is naturally present. As in the case reported, there may be small isolated spots which are distinctly darker. The face and the backs of the hands are early affected. The mucous mem-

brane of the conjunctivæ, mouth and vagina are pigmented. Even the serous membranes may be discolored in patches. On the other hand, an occasional case, which is otherwise typical, may show no pigmentation.

Such a case is reported in the Medical Record of November 3, 1894, by Dr. Warren Coleman, of New York. Adrenal disease was not supected during life. "The patient was a Danish sailor, 36 years of age. He entered Bellevue Hospital as a case of constipation. Death took place about two weeks later, without any assignable cause. During his stay in the hospital he attracted attention only as a case of obstinate constipation with marked inanition. No interpreter could be found so the history was not obtained. There was marked asthenia, with no apparent cause. He had a slight temperature which was at no time over 101 degrees. The heart action was feeble and the surface of the body showed a poor circulation. The pulse varied from 72 to 88. The constipation continued, in spite of vigorous treatment, up to the time of his death. There is no record of alternating diarrhœa. At the autopsy the body was found anæmic, but not much emaciated. The heart weighed nine ounces and the walls were pale. The valves were normal. The right lung was bound to the chest wall by a few old adhesions. The upper lobe contained several tubercular masses of considerable size, in a state of caseation, while throughout the middle and lower lobes a few small nodules were found. The left lung was in a similar condition. The bronchial glands were enlarged and cheesy at the center. The left adrenal body weighed one and a half ounces. Its original shape had been entirely lost. On section it was found to be caseous, and a greenish-yellow pus exuded from several points on the cut surface. The cheesy matter had become calcareous at many points. The capsule was much thickened. The right adrenal was only one-half of the normal size and weighed only one-half ounce. It contained one large and numerous small calcareous masses. The microscopic examination showed the process to be tubercular. The skin and the mucous membrane of the mouth were carefully examined for evidences of discoloration, without success. No sufficient cause for death aside from the condition of the adre-

nals, was found at the autopsy. The appearance presented by the adrenals left no doubt that they became involved prior to the lungs or bronchial glands."

Dr. Coleman states he has systematically examined the adrenal bodies in all the autopsies he has performed in Bellevue Hospital for two years (the number not being given), and that this is the first instance in which he has found them tuberculous, though many cases showed extensive tuberculosis in other parts of the body. Unfortunately, in the above case the semilunar ganglia and the abdominal sympathetic nerves were not removed for examination.

The important conclusion from this case is, that tuberculosis of the adrenals, *per se*, even though both glands be entirely destroyed, is not productive of skin discoloration.

In the Medical Record of September 29, 1894, there is reported a case of Dr. Lazarus, of Berlin, in which a child, aged 3½ years, died from a tumor of the left adrenal. The tumor represented one-third of the entire weight of the child, which was 37 pounds. Sarcomatous degeneration of the tumor had begun. During life, there was no discoloration of the skin. This case goes to show that malignant tumor of the adrenals may exist without pigmentation of the skin. In Addison's disease spots of leucoderma, or, absence of pigment, are sometimes seen.

Gastro-intestinal disturbances, especially nausea, vomiting and constipation alternating with sudden attacks of diarrhœa, are common. There is a tendency to faint, together with headache, as well as pain in the epigastrium and hypochondria. Over and above all is the marked asthenia. Without this the diagnosis is uncertain, for pigmentation may occur in other diseased conditions, especially with abdominal tumors, as tubercles, cancer or lymphoma. It is quite frequently seen in tubercular peritonitis. In pregnancy, and in uterine disease, patches of pigmentation are common. In liver disease, and even in habitual sluggishness of this organ, patches of staining are often seen about the face and forehead. Irritation of the skin by lice and dirt, sometimes called vagabonds' discoloration, must be remembered. In rare instances the skin has been so deeply

discolored in melanotic cancer as to be mistaken for Addison's disease. In exophthalmic goitre patches of pigmentation and leucoderma are common.

These various sources of pigmentation of the skin must be excluded, and asthenia must be present before making a diagnosis of Addison's disease. After death, the abundance of fat in the abdominal wall, in marked contrast with the general emaciation, has been frequently noted. The liver and spleen are often enlarged, as well as Peyer's patches and the mesenteric glands.

The prognosis is bad. Death may occur in a few weeks, especially where bronzing of the skin is slight or absent, with great prostration, vomiting and diarrhœa. It would seem easy to confound such a case with typhoid fever or acute tuberculosis. Usually, however, the disease is protracted, lasting months, and even years. In the longer cases, periods of improvement may occur, and hope be entertained of final recovery. Sooner or later, however, exacerbations are sure to occur, and the end is always the same.

TREATMENT.--In the present state of our knowledge of the disease, the treatment must be symptomatic. In general it is to husband the patient's strength, and, if possible, to increase it. For the above reasons, cases are seldom diagnosed until they are well advanced. At this stage quiet, and in some cases, absolute rest in bed is necessary, for sudden death in a number of instances has apparently been caused from syncope on slight exertion. The diet should be light and nutritious. Milk is often the best food. Arsenic and strychnin, iron if there is anæmia, ice, champagne, and hydrocyanic acid for the irritable stomach; bismuth for diarrhœa. If there is constipation, mild laxatives should be chosen, which will not disagree with the stomach.

When the function of the adrenal shall be better understood, important additions will follow to our present knowledge of the etiology and treatment of this disease. Within the past two years a remarkabte amount of thought has been directed to the ductless glands of the body. The adrenals have not escaped this research. Oliver especially has been working with the ex-

tract of supra-renal capsules, and has found that in case of human beings it was capable of producing an increase of vascular tone and a diminution in the size of the arteries. In other words, its effects were contrary to those of thyroid extract. Experimenting on animals, he has shown that both alcoholic and aqueous extracts of the adrenals contained a powerful physiologic substance, which, on injection in extremely minute doses, produced a remarkable effect on certain parts of the nervous, muscular and vascular systems. Whether this is a useful substance, made by the adrenals from the blood to be used as required to affect the circulatory system, or whether it is a poison carried to the adrenals for them to render harmless, is not, according to Oliver, yet known.

The therapeutic value of the animal extracts and other products of the animal system is perhaps not yet fully known or acknowledged. Enough, however, has been demonstrated in this direction to lead to the hope that light will soon be shed on the treatment of Addison's disease.

VOMITING OF PREGNANCY AND ITS TREATMENT.

P. J. MCHUGH, M. D., FORT COLLINS, COLO.

Nausea and vomiting are common digestive troubles in the pregnant condition. They are manifestly unfortunate conditions at this time, for they often embarass the growth and life of the embryo, as well as seriously impair the health and threaten the life of the mother. Recent and remote statistics show many deaths to have resulted from this cause, and in daily practice, the death and expulsion of the foetus is a common occurrence. Guiniot in 1863, collected 118 maternal deaths from it; Delbert 62 deaths in 1854, and recently many deaths have been reported. The true cause of nausea and vomiting during pregnancy is yet undecided. Giles, of London, does not think it a physiological phenomenon, but charges it to nervous instability depending on nervous irritability during the pregnant state. T. R. Baker attributes it to a reflex action produced on the sensitive nervous system by the presence of the developing

ovum. Guiniot says it is caused by an abormal state of the uterus or its appendages, as ulcers, excoriations, flexions, etc. J. Wissell attributes it to the loss of red blood corpuscles and albumin.

The cause of this condition, in my experience, is manifestly a reflex nervous difficulty due to the presence of the ovum and cessation of menstruation. In vomiting of the incoerceable type however, we rarely fail to find some gastric difficulty preceeding conception. When conception takes place, the reflex nervous disturbance aggravates the stomach difficulty, and nausea and vomiting of the most distressing type is the result. Women in this country are apt to suffer from nervous dyspepsia, and in this class of cases, I have found severe types of vomiting. Displacements and diseased conditions of the uterus and its appendages, by their detrimental effects on the whole nervous mechanism, add their mite to bring about this undesirable condition.

Giles, of London, says nausea and vomiting occur most frequently in patients between the ages of 20 and 25 years. Out of 300 cases it occurred in 90 per cent of primipara, and patients who suffered from dysmenorrhœa before pregnancy, were affected less than those whose periods were easy. In my short experience I have found the opposite conditions. Seventy per cent of the cases occur in the first three months, and about 10 per cent in the last three months. The vomiting in most of the cases I have seen, has begun gradually. There is first, nausea, occurring usually in the morning after arising. There is not an absolute distaste for food, but when an attempt is made to administer it, the stomach will not accept it. Later, in the severer cases, vomiting is the rule. It may occur at any time of the day, and as it progresses, the patient becomes anaemic and weak. The ejected matter will depend on the condition of the stomach, but usually consists of glary mucus, bile and sometimes blood. (Charpentier.) As a rule the nausea and vomiting can be controlled by some simple remedy, especially if no stomach difficulty attended pregnancy. When this is not the case the vomiting is harder to control. Frequently, as a result of it, a severe gastro-intestinal hyperaemia is set up. The stomach and the whole abdomen becomes tender to pressure: the

tongue is dry and brown; sordes collect on the teeth; the pulse is rapid; the temperature elevated from 1 to 5 degrees with intermissions and exacerbations. The countenance assumes a haggard and pinched appearance; the disposition is irritable, and complete inability to retain food exists. Since I have been in practice I have had quite a number of cases with symptoms just enumerated. One patient with the above symptoms, to my knowledge, did not eat or sleep for three weeks. Great prostration existed and it was with difficulty that I managed to saved her life. In this class of cases we frequently find albumin in the urine. Diarrhœa is regularly present. The exhaustion that accompanies the great retching and straining becomes frightfully alarming at times, and it is not uncommon to see the patient sink away into an almost lifeless condition. I have had no deaths, but exhaustion is the usual route which those who die, travel over. (Charpentier.)

There is a form of vomiting which I have noticed, that differs from the type just mentioned, by the absence of fever and general abdominal tenderness. It is an aggravated form of gastric catarrh, accompanied with an excess of acid in the gastric juice. It may be only one stage of the type spoken of, but I have had so many cases of it that I feel compelled to consider it a type in itself. The following case taken from my case-book will illustrate:

Mrs. S., aged 24, small in stature, became pregnant six months after marriage. To my personal knowledge, patient suffered from dyspepsia for a long period before marriage and pregnancy. Six weeks after pregnancy she was attacked with nausea and vomiting. Two weeks later she had an abnormal increase of acid in the stomach. This continued to grow worse as time went on. Nausea and vomiting also became worse. Emaciation became marked, and strength failed, so that she was unable to leave her room. Desire for food was good, but to retain it was almost an impossibility. As a result of the vomiting and weakness, a miscarriage was threatened. Rest in bed, with uterine sedatives, stopped this. All the remedies recommended for acid dyspepsia were given, together with the proper diet, but to no avail. Being compelled to absent myself from the city for three weeks, a

homeopath was called in. Little pills and all the paraphernalia, as glasses, teaspoons, half-hourly and hourly doses, did not control the vomiting or prevent the flow of acid. After each meal, even after a glass of milk, the acid would flow out in enormous quantities. The evening repast. or attempted repast, was sure to produce a restless and painful night. The whole stomach, œsophagus and buccal cavity became raw and sore. The gums became swollen and bled freely; the salivary glands took to secreting an abnormal quantity of saliva, probably from the stimulating and irritating effects of the acid, or possibly from the pregnant condition. Sleep became almost impossible on account of the enormous amount of saliva that accumulated in the mouth. Blood was vomited later on, due no doubt to peptic ulcer of the stomach, caused by the erosive effects of the hyperacidity of the mucous lining. The acid passed down through the intestinal tract; brought on violent attacks of diarrhœa attended by great termina. The anus became excoriated and painfully tender from the effect of the acid fæces. The uterus was anti-flexed. It pressed on the bladder, producing an almost constant desire to urinate. The bladder became quite sore and painful, and when urine was passed, great agony accompanied it. I attribute the vomiting partly to the uterine displacement. The treatment of the case I shall speak of later.

As to the treatment of nausea and vomiting of pregnancy in general, I believe we depend too much on so-called specifics. There is no difficulty in the whole line of women's diseases that will tax our patience and outwit us like some of these persistent attacks. I believe the reason for much of our disappointment is the fact that we often neglect to look for the true cause of the difficulty. Unfortunately there are causes which can not be dealt with at this time, namely, displacements, etc., without the fœtus or membrane being injured, but in the great majority of cases the cause can be reached and the patient early relieved of distress.

I said that functional or organic diseases of the stomach have much to do with vomiting of pregnancy; and I believe that those women who are not victims of some such organic trouble before pregnancy will not suffer severely from vomiting during

the parturient state. It is true that many women are relieved of their vomiting by stretching the circular fibres of the external os, but I believe that those who have good upeptic stomachs before pregnancy will not require such stretching, for their vomiting will not be severe enough to require such treatment, if vomiting they have at all. I say, then, that the condition of the stomach should be looked into in all cases of vomiting of pregnancy. Remedies should not be given haphazard, but in a scientific way. If the condition is gastric catarrh, the treatment should be for gastric catarrh; if ulcer of the stomach exists, this should receive our attention; if any of the forms of dyspepsia, the particular form should be treated, and in all cases the reflexes should be quieted by bromide, chloral, etc., either by the stomach or per rectum.

I shall not enter into the medicinal and dietetic treatment of gastric catarrh, and the various forms of dyspepsia as they are too well known to require enumeration here. I shall only refer to the stomach tube in brief as a remedy par excellence in this trouble. Its use has convinced me that the stomach is the organ that most needs our attention, and that in the stomach alone we find the real cause of incoerceable vomiting. The vomiting of course, is the vomiting of pregnancy and is primarily due to the conception, but I repeat that the severer types find their *materia morbi* real, in some old stomach difficulty.

I shall follow up the case previously cited, and the salutory effects the stomach tube had on it. After repeated trials of the various remedies that are recommended to control acid dyspepsia and the other conditions that might produce acid dyspepsia, I proposed the stomach tube. My patient did not know anything about this mode of treatment, hence it seemed somewhat irregular to her. I was not overly anxious to resort to it myself, for I feared ulcer of the stomach. Procrastination was my course, but in two or three days more, conditions became so bad and my patient so emaciated, that I was content to try anything. One morning I took the tube with me, and luckily my patient had received a letter the previous night from one of her lady friends stating that her doctor was making her swallow a garden hose, and through it washed out her stomach, and that

she was gaining right along. I introduced the tube without much difficulty. My patient was resolute and determined, and had confidence in my ability to pass the tube without injury to her. In this class of cases, above all others, it is necessary that they have confidence, otherwise it will be hard to get them to submit to the tube. I washed the stomach every night about 9 or 10 o'clock; the relief it gave passed my most sanguine expectations. In one week from the date of its first use my patient began to have better nights and to keep her food down. In three weeks she was able to be out of doors and in six weeks she had gained back her usual strength. The acid ceased to flow. the gums and mouth healed over and the bowels became regular. Patient miscarried eventually, and this may be urged as an objection to the tube. It certainly was not in her case, and I feel certain that the lavage saved her life. The gagging and straining caused by the tube is not any more, nor I think as much, as the effort at nausea, hence is no more liable to produce expulsion of the fœtus.

I have had equally good results from it in other cases, all of which went to full term, and where its use is not contra-indicated by heart affection, lung disease or ulceration of the stomach, it will be found, when simpler means fail, a valuable adjunct to our armamentarium of therapuetic agents in the treatment of vomiting of pregnancy.

DISCUSSION.

DR. STOVER: One thing that has not been mentioned in the treatment of this condition, when emaciation has taken place, and especially when marasmus, as in the case reported, appears, is rectal alimentation. Peptonized milk is what I mostly use, with very good results.

DR. BURNS: It is very probable that the nausea and vomiting results from the changes produced upon the system as a whole, and in the majority of cases there is no disturbance of the uterus; *i. e.*, we can place it in the same category as the vomiting of acute diseases. The disturbance is produced by the changes in the nervous mechanism of the body, the changes in the blood, the suppression of the menses, constipation and

mental knowledge. Women knowing that they should vomit naturally, think more of this subject than they should, and hence upset their digestion. In regard to the treatment: It is my custom to first prescribe five or ten minims of dilute hydrochloric acid before meals; then, if this fails, to prescribe papoid after meals. If these fail, I prescribe one or two doses of hydrocyanic acid dilute or cocaine. The last two remedies I have only used a few times. It may be true that one physician gets better results than another, from the fact that he has more faith in his remedies. He unintentionally informs his patients that they will surely get all right, and the mental effect as much as the medicine, cures the patient. I consider that nausea and vomiting in general, and in pregnancy, is due to a partial reversion of the natural peristalsis towards the rectum. If you increase the peristalsis towards the rectum in the proper amount you cure the trouble; and for this I would recommend enemas and cathartics, even croton oil. I had one patient who had been sick in bed for the first six weeks of the pregnancy when I saw her. The usual remedies failed, including cathartics. Enemas cured the trouble. We must always remember that along towards the end of the third or fourth months the patient generally gets well, even if no medicine has been taken.

DR. A. J. ROBINSON: The very serious cases of vomiting are the ones that we should direct our attention to. I feel that one of the most important causes has been left out, or only slightly mentioned, and that is, the displacement of the womb: and I think that when we have a case that has become persistent, we should at once examine, and see if we do not find some displacement. These occur more frequently, I think, from the second to the third month, as the womb is beginning to become enlarged and compressed. During the last year I have had a number of cases under observation, two of which were relieved only by raising the womb up to its place, and doing that each day until the womb became large enough to stay up itself. One other case would not be relieved by this procedure, and finally an abortion had to be performed on account of great emaciation. All these cases had persistent vomiting. It did not make any difference whether they took nourishment or not, only a few

minutes would occur between each vomiting. I think these are the cases that should have our special attention, although all cases require more or less attention.

DR. STUVER: I desire to congratulate Dr. McHugh on his most excellent and interesting paper. This is one of the troubles. I suppose, that every practicing physician has had to contend with, and it is one of the troubles that gives as much room for ingenuity and for good common sense as anything else that a physician will meet in his practice. Of course the causes are manifold, and that being the case, the treatment must likewise be varied. We have certainly a very great variety of remedies in the treatment of vomiting in pregnancy. I merely wish to call attention to one or two things that I have used with success in this connection, that are a little out of the ordinary run of treatment. In hyper-sensitive and highly nervous cases I have found a combination of antipyrin and cocaine extremely useful. I have treated a number of cases with this combination that I could reach in no other way, having used hot water in one case without any effect. I have also seen good results from the the administration of sub. gal. bismuth, in five or ten grain doses; and it has succeeded where the ordinary treatment has failed. Some cases apparently will not yield to any treatment. I saw one case in which displacement of the uterus had been corrected, and all sorts of treatment resorted to, that apparently yielded to the administration of pop-corn. Nothing whatever could be retained on the stomach, until some one suggested that we give the patient some pop-corn to eat, and as she could not get anything else to stay down, we finally tried it. The result was excellent.

DR. HARRISON: I say I can beat the popcorn business. That is this: After trying everything that I could hear of, I found that to separate the husband and wife, and have them stop their "nefarious deviltry," was the best remedy in one of my cases.

DR. MCHUGH: I practically agree with Dr. Stover about rectal alimentation. The stomach, of course, may be disturbed through intestinal indigestion and constipation.

ABDOMINOSCOPY IN OBSTETRICS.

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Abdominoscopy, or the examination of the abdomen for diagnostic purposes must play an important part in the future of obstetrics. Hence anything of value should be added to our present literature, and that which is known, grouped into one article. But as only fifteen minutes is allowed for the reading of this paper, I have decided to lay particular stress upon those things which are of most importance and most easily forgotten or wrongly interpreted, and those which are not generally known.

We will confine ourselves to the examination of the abdomen in advanced pregnancy, i. e. after the seventh month. We will only discuss palpation and auscultation, as inspection, percussion and mensuration of the abdomen are of less importance.

ABDOMINAL PALPATION.

Abdominal palpation is used to determine the following:

First—The presentation and position of the fetus, its attitude, size, movements and mobility.

Second—The diagnosis of twin pregnancies.

Third—The height of the fundus, its shape, size, position, intermittent contractions, distention, thickness, firmness, sensitiveness and mobility.

Fourth—The quantity of liquor amnii.

Fifth—Excessive distension of the bladder.

Sixth—Bandle's ring, the round ligaments, the ovaries, the umbilical cord, the placenta, the uterine pulsation, the quantity of adipose tissue in and the tension and thickness of the abdominal walls.

Seventh—The progress of labor.

It must be remembered that in practice this order is followed only in part. I generally find the presentation and position of the fœtus and then such of the others as I wish to determine. This method I will follow to-day as there is not time to mention all.

PREPARATION OF THE PATIENT AND THE EXAMINER:

The Patient's Clothing:—None of the patient's clothing

need be removed. Tell the patient to simply loosen her clothes around the waist and to lie down upon the bed and place a sheet over herself. The bed should be firm—some prefer a table, but this I consider too high.

The Patient's Position:—Place the patient squarely on her back with a pillow or two under her head and shoulders. Flex the thighs and legs somewhat and separate the knees about a foot apart. Too much or too slight flexion of the lower extremities puts the patient in a constrained position which is liable to cause contraction of the abdominal muscles.

The above position gives much more satisfaction than any other, but many have the limbs extended and the head only slightly raised. This might be of value in some cases, to bring the fœtus nearer the abdominal wall. The patient's arms should be placed by her side where they can be used to hold the sheet from slipping off her abdomen.

The Physician's Hands:—These should be clean, warm and soft. The fingers should be kept in opposition when feeling for broad surfaces, as the back, but separated when feeling for the extremities and the like. The palmar surface of the hands are used, and only the tips of the fingers for finding deep seated parts.

The Physician's Position:—He should stand facing the patient's feet with his hands under the sheet when examinign for the height of the fundus, or the contents of the fundus he may turn so as to face the patient's abdomen or even her face.

THE DIAGNOSIS OF THE PRESENTATION AND POSITION OF THE FŒTUS.

Before proceeding with the order in which an examination should be made, it is best to study the diagnostic features of the different parts of the fœtus when felt through the uterine and abdominal walls.

The Fœtal Head:—The fœtal head, through the abdomen, is felt as a smooth, round, hard body, which is generally movable by pressure. The forehead can be distinguished by its greater smoothness and the prominence of the temples. The occiput is, relatively speaking, rougher and larger than the forehead.

The Breech is uneven, and not as large as the head. It can often be grasped within the flexed hand of the examiner, because of its small antero-posterior diameter. It will not move without the whole body moving. Near it can generally be felt smaller objects, the lower limbs of the fœtus. (Some speak of the breech as being broader than the head. This is a mistake. The transverse diameter of the head is greater than the corresponding diameter of the fœtal pelvis, and the antero-posterior diameter of the head is greater than that of the fœtal pelvis. The bi-parietal is 3.75 inches, while the bis-trochanteris is only 3.5. The sub-occipito-frontal, the smallest antero-posterior diameter of the head, is 4.5 inches, while the antero-posteror diameter of the pelvis, including the flexed extremities, is only 4 inches.) The sacral portion of the breech is much more even than the lower and anterior part, which is uneven because of the tuberosities of the ischium and the furrow between the thighs.

The Back is felt as a smooth, broad, slightly arched surface, extending nearly the whole length of the uterus.

The Limbs are felt as short, small objects, which generally move or can be grasped. The feet can often be felt as little oblong bodies attached to a longer body at right angles. It is difficult to distinguish the hand from the rest of the upper extremity.

The Shoulder is felt as a small, mobile, rounded object, continuous with the trunk, and situated just above the head.

The Side of the Fœtus is liable to be mistaken for the back, but it becomes uneven at both ends—the shoulder or arm above, the crease between the pelvis and the flexed thigh below. Rarely, the unevenness caused by the ribs can be felt through the abdomen.

The Chin is recognized with difficulty, because of its situation, but is distinguished by its proximity to the trunk, its horseshoe-like shape, and by its size, which is much less than that of the occiput, the only thing it is liable to be mistaken for.

The Unevenness of the Face, especially the projection caused by the nose, can frequently be felt, but in such cases we do not need this differentiation, because the whole fœtus is easily felt.

THE DIAGNOSIS OF PRESENTATION AND POSITION.

1.—Fœtal Movements:—Place gently the palmar surface of a hand on each side of the uterus. Often in a short time you will be enabled not only to feel the lower extremities, but, perhaps, also the upper extremities, the back and the breech of the fœtus, and then make a diagnosis from this simple procedure, which, later, would often be impossible from the presence of uterine contractions induced by more extensive manipulations. If no movements are felt, having the patient cough will sometimes excite them.

2.—The Diagnosis of the Forehead:—I always assume that we have a vertex presentation and proceed at once to look for the forehead in the brim of the pelvis as follows: Pass the hands downward until the pubes is definitely felt, then carry the hands upward and dip them into the pelvic inlet, and feel for a hard, projecting, smooth object—the forehead. Here is the point where many make a mistake. They think that the occiput is the larger object because it appears so to them as they look at the head of a child, but you must remember that the fœtus in utero is in a folded attitude and that the head is bent forward, often so much so that the chin touches the chest. Now, notice my head, which is bent forward. If you were to pass your hand upward along my back and continue in a straight line, after leaving my shoulders your hand would not touch my head, but be in empty space. If you passed your hand up my chest you would come in contact with my face, of which the forehead is the more prominent part. Hence, in a vertex presentation, with the fœtus in its normal attitude, the examiner feels a hard, prominent object, the forehead, in one side of the brim while in the other side his hand sinks deeper. There are exceptions to this: 1.—When the head is not well flexed the occiput may cause a projection which might be mistaken for the forehead, but if a careful examination of the whole fœtus is made at every examination, this mistake will not occur, and the diagnosis of incomplete flexion will be made. 2.—When the head does not lie squarely over the brim, or is in one of the iliac fossæ, the hand often sinks as much, and sometimes more. on the side of the pelvis corresponding to the forehead, and

this may be accompanied by incomplete flexion of the head. Here the diagnosis is made by comparing the position of the other parts of the fœtus with that of the head. 3.—When the head is very low in the pelvis the back of the trunk or the shoulder is felt as a promient, hard object in direct contact with the brim. Mistake here can be prevented by noting that this object at the brim is continuous with and on the same plane as the back (and we ought to feel the forehead deep on the opposite side).

After we have found the forehead, we must find out whether it is to the right or the left, and whether it is anterior or posterior. For, from the position of the forehead we make our diagnosis of the position of the fœtus. If the forehead is to the left anteriorly, we know the occiput must be to the right posteriorly, and therefore that we have a R. O. P., *i. e.*, a right occipito-posterior position. If the forehead is to the left posteriorly, a right occipito-anterior position. Whether the forehead is anterior or posterior is often told by feeling the forehead close to the brim anteriorly, or close to the sacro-iliac joint posteriorly. Sometimes the forehead seems to lie nearly transversely. Then the diagnosis is difficult, but can be made by passing your hand along the side of the fœtal head, from the forehead to the occiput and seeing if your hand becomes more superficial or deeper, or remains at the same depth. Suppose the forehead were to the left, and that as we passed our right hand towards the patient's right, we found that it became less deep, we would know that the forehead was to the left posteriorly, as in that case the side of the head, as we passed towards the occiput would become nearer the abdominal wall. (In this position it is often possible to feel the occiput on a plane anterior to the forehead.)

If the hand sank deeper as it passed towards the occiput, we would have an anterior position of the forehead.

Sometimes the forehead is anterior and apparently in the median line. In such cases the deeper temple is on the side of the pelvis that the forehead, as whole, should be; because, if the forehead is anterior, the occiput must be posterior, and if the occiput is posterior, the anterior temple must, of neces-

sity, be the one near the side in which the occiput is situated.

(We have found the forehead to the left and anteriorly, and the head well flexed—*i. e.*, we feel a hard, smooth object to the left and anteriorly. Now, if we pass our hand towards the right along the side of this hard object and it sinks deeper, we diagnose a right occipito-posterior and reach for the anterior shoulder.)

The Anterior Shoulder:—In posterior positions this is found opposite the ilio-peritoneal eminence on the same side as the back. In anterior positions, the anterior shoulder is situated generally a little anterior to the ilio-peritoneal eminence on the side opposite the side in which the back is situated (and may be any place between the eminence and the median line, and sometimes a little beyond the median line, as the back of the fœtus tends to incline towards the back of the mother when she is in the dorsal decubitus.)

The anterior shoulder is generally easily felt by semi-flexing the fingers of your right hand like a hook and dragging them upwards from the brim, first upon one side of the lower abdomen and then upon the other. A little care should be used to surround the shoulder and thus prevent our mistaking an arm for the shoulder. The shoulder is situated generally a little above the brim, say from two to four fingers' breadth.

In our supposed case of right occipito-posterior position, we should find the anterior shoulder a little above the right ilio-peritoneal eminence, but even if we diagnose it here we should examine the left side also, so as to prevent the possibility of a mistake.

The Back:—Pass the hands upwards on either side of the uterus and press each hand towards the other more or less firmly. If the back is to the right and posterior we will get a broad, smooth mass, whose resistance will increase as we pass our hand backward on the right side of the abdomen, because we come in contact with more of the back as we press backwards. If the back were to the right and anteriorly, we would find it reaching a little past the median line on the left, and our hand would pass beyond it on the right side posteriorly. The diagnosis of the situation of the back can be further facilitated

by placing one hand flat on the median line of the abdomen and pressing the uterus gently backward (Crede and Leopold). This displaces the liquor amnii to one side of the uterus and the fœtus to the other side with its back closer to the abdominal wall.

The Extremities:—At the same time that one hand is finding the back the other hand ought to have felt the extremities. To better feel the extremities we make a piano-like movement, i. e., slight strokes with the fingers of the hand, first, on the side of the abdomen, where we supposed the extremities should be, then upon the other side. (If this fails, we may use a couple of fingers and press deeply. While we are palpating with one hand for the limbs, we should use the other hand to press the back of the fœtus so that the extremities will be pushed to the front and in contact with the abdominal wall.)

If we find the extremities to the left and anteriorly. i. e., feel the feet to the left, easily and not deeply, we have further proof of a right occipito-posterior position. If the position were a right occipito-anterior we would not feel the extremities as easily, and we would probably touch the sides of the legs instead of the feet. If the feet were felt they would be found deeper than the legs.

Often not only the feet and legs, but also the arms can be felt. (The arms are found about opposite the position of the shoulder, and either extending horizontally or a little downward over the face, or more often a little upward over the chest.)

If it is difficult to find the extremities we may find the breech, and then carefully palpate outward along the thigh, being careful not to skip any of the surface or allow both hands to leave the thigh at the same time. In this way the knee, leg, and foot may be found after other methods have failed. (If we can not find the extremities we may try to excite their movements by placing a cold hand upon the abdomen, or by moving the fœtus back and forth with both hands.) It must not be forgotten that sometimes the back is so squarely in front that it is impossible to reach the extremities.

The Breech:—To find the breech, it is best to sit in a chair facing the side of the bed. With your hand, which is nearest

the patient's head, press over the fundus of the uterus. If you feel the breech and can semiflex your hand over it you have found the antero-posterior diameter of the pelvis and know where the back and extremities ought to be, i. e., that either the back or extremities is in front of this diameter while the other is posterior. The situation of the breech may be on either side of the mediam line, independent of the position of the fœtus, and depends upon the arching of the fetal back, but is more often on the same side as the back. In a right occipito-posterior position, the breech is generally to the right, and the sacral surface is always posterior and looking to the right, and while the uneven portion is in front. In a right occipito-anterior position the sacral surface would be anterior more or less, and looking to the right.

NOTE.—We have proceeded so far under the supposition that we were examining a vertex presentation and a right occipito-posterior position, but have at the same time excluded right occipito-anterior position. I have not stated what conditions would be found in the left occipito-anterior and posterior positions because they correspond identically with those of right occipito anterior and posterior positions respectively, (except that in left occipito anterior and posterior, the back is generally a little more anterior than in right occipito anterior or posterior, and it must not be forgotten that when the patient is in the recumbent position and the uterus is relaxed, the back of the fœtus tends to fall posteriorly to one or the other of the two sides of the projecting vertebrel column. In one case during labor my assistant and myself individually found the back by abdominal palpation to the posterior while the occiput by vaginal examination was anterior.)

DIAGNOSIS OF OTHER PRESENTATIONS THAN THE VERTEX:

The Face Presentation:—Here we would find the forehead less prominent, while the occiput would be prominent, because the head is extended. As a rule I think we can safely say that we do not diagnose a face presentaiion during pregnancy, because it does not often exist until labor, but as the head is more or less incompletely flexed in these cases during preg-

nancy, we can diagnose incomplete flexion and the liability of a face presentation.

If the head is extended, the forehead probably can not be felt, but we may feel the chin. The occiput forms a well-marked, hard object, which is very likely to be mistaken for the forehead, but by deep pressure, a furrow may be felt between it and the back.

The back is deeply indented, and more or less concave from above downwards. Hence you are liable to mistake the arched surface of the fœtal breast and abdomen for the back if the extremities are not felt, and also take the occiput for the forehead. The diagnosis of a face is one of the most difficult. unless the abdominal walls are relaxed and the extension of the head marked. The diagnosis of the position is made out by the situation of the occiput, the back and extremities.

THE BREECH PRESENTATION:

In this presentation you would find at the "brim" the breech of the fœtus. There would be no hard object corresing to the head, and if labor was not well advanced, we would be enabled to pass our fingers completely in under the object there found—the breech—and also to feel the feet and legs to one side of it. Pressure against the fundus, which comes in contact with the fœtal head, is liable to make the patient cry out. This is a new sign brought out within the year by Pinard. It can not only be obtained in breech presentation, as mentioned by Pinard, but also in transverse presentations, and is probably due to the compression of the uterine and abdominal walls between your hand and so hard an object as the head of the fœtus.

THE SHOULDER PRESENTATION:

In the shoulder presentation we would find the "brim" empty, or partially occupied by a soft mass--one of the shoulders. In one of the iliac fossæ, a little above, there would be situated the fœtal head, and in the opposite side, more or less higher up, the breech. The trunk would be felt extending obliquely across the abdomen, with either the back or the extremities in front. The transverse diameter of the uterus would

be greatly increased, and there would probably be a pendulous abdomen. In this presentation, the diagnosis of position is made by the position of the head and the back or extremities.

TWIN LABORS:

The diagnosis of twins depends much upon the presentation. The main diagnostic point is the feeling of two heads; but this is not always easy, for if one head is in the fundus, it is liable not to be felt unless you push your hand up in under the diaphragm, as the head is often otherwise out of reach. If both are vertex, and in the same position, say left occipito-anterior, *i. e.*, one partially in front of the other, with the back of the deeper one in relation with the front of the other, you may diagnose only one fœtus by mistaking the forehead and extremities of the deeper fœtus for those of the superficial fœtus, whose back you will feel. In a case of twins so situated, I felt a ridge between the fœtuses, but thought it was an upper extremity, which it may have been, or more likely, the edge of the back of the second fœtus.

THE DIAGNOSIS OF ROTATION OF THE OCCIPUT BY ABDOMINAL PALPATION:

This may be made out, but I have found that abdominal palpation in the second stage of labor is generally so painful to the patient as to be impractical unless an anæsthetic is used. In a case of inertia, in which chloroform and forceps were being used, I diagnosed posterior rotation of the occiput by abdominal palpation.

CHANGES IN THE POSITION OF THE FŒTUS:

If you diagnose a presentation definitely, and at labor find that abdominal palpation denotes another position, you should not decide that you made a mistake in your former diagnosis until you get the patient to tell you how she has felt since your former visit. If it were a breech, and is now a vertex presentation, she will tell you that at a certain time since she saw you last the fœtus became very active, and she felt as if it were turning all around, and that it caused her considerable pain, but that the fœtus shortly quieted down, and since then she has felt all right.

The Height of the Fundus, Its Shape, Size, Position, Distention, Thickness, Firmness, Sensitiveness, Mobility and Intermittent Contractions.

The height of the fundus can be ascertained by the examiner facing the bed, and applying his hand which is towards the patient's head to the patient's abdomen, and repeatedly pressing inward and upwards with the ulnar surface of the hand. In advanced pregnancy it is best to begin at the navel, and work upwards. The shape, size, etc., of the fundus, except the uterine contractions, are found by facing the patient's head, and grasping the fundus with both hands. To obtain the frequency and severity of the intermittent contractions, the hands should be laid gently, without causing any irritation, upon the fundus of the uterus, and held there until a contraction is felt.

The Quantity of Liquor Amnii is estimated by noting the relative size of the uterus and the fœtus, and the amount of fluctuation.

Excessive Distention of the Bladder.—Feel for a pear-shaped, fluctuating body above the symphysis, and note how high its upper border is.

Bandle's Ring:—Its position can be told by feeling, on the anterior surface of the uterus, a transverse ridge. The uterine wall above this ring is thick, while that below is thin.

The Round Ligaments are felt as round sensitive cords extending from either side of the brim upward to the outer angles of the fundus. They can be felt during and between uterine contractions and if thick and strong indicate good muscular developments and therefore effective contractions of the uterus.

The Ovaries are generally situated half way on a line between the anterior superior iliac spines and the umbilicus. Especially is this true of the left one which is more often enlarged and sensitive to the touch.

The Umbilical Cord may be felt if it encircles the neck or the trunk of the fœtus and is distinguishable by its pulsation.

The Position of the Placenta can be supposed by finding a situation in which there is an otherwise unaccountable thickness, and Crede and Leopold say that if the presenting head or breech is felt uncommonly covered, indistinct and somewhat

softer than usual, the suspicion is justified that the placenta lies in the lower segment.

The Uterine Pulsatio may sometimes be felt, especially in women who suffer from a chronic congestion of the uterus in the non-pregnant state. It sometimes resembles in feel very closely the top of a fetal extremity, but its regularity will prevent a mistake in diagnosis if the examining hand is kept in contact with the uterus for a short time.

OTHER METHODS OF ABDOMINAL PALPATION.

In the above method, after feeling for the motion of the extremities by simple contact of the hands with the abdomen, we begin at the pelvis and work upward. This method of starting at the pelvis and working upward was taught me by my friend, Dr. Buchtel. Crede and Leopold start at the fundus and work downward, using four manipulations which will be mentioned below. Some may prefer Crede and Leopold's method to ours, and it is a good method to pursue after using our method, if you fail to make a definite diagnosis. Our method is better because you have something definite—the forehead—to base your diagnosis on from the start, while if you begin at the fundus you may feel the extremities on both sides of the abdomen or mistake the side of a thigh for the breech. Again, our method tends to prove the diagnosis, step by step.

Crede and Leopold use the following four manipulations in the order given:

First Manipulation :—To find the height of the fundus and its position, the period of pregnancy, the lie of the foetus and its size, and to find if the head or the breech is in the fundus, face the patient; sit by her side and lay the palms of the hands on the abdomen with the finger tips of each hand in opposition, and the wrists far apart, and pass the palms gently upward over the uterus to the fundus.

Second Manipulation :—To find the back and extremities, move the hands from the ensiform cartilage to the sides of the abdomen, and lay them flat on the sides of the uterus. If this does not show definitely the situation of the fetal back, place one hand flat on the median line of the abdomen and press the

uterus gently backward so as to displace the liquor amnii to one side and the back to the other.

Third Manipulation:—Use this manipulation to diagnose the position of the presenting part, head or breech, when it is either in or above the pelvic inlet.

Spread the fingers of the right or left hand as wide apart as possible, and with the thumb and tip of the middle finger seize the presenting part of the fetus just above the pelvic inlet. When the head is engaged in the pelvic inlet as in primiparae it should be sought in the direction of the pelvic cavity with the tips of the thumb and middle finger. When the head is higher, as in multiparae, the thumb and middle finger should be held more horizontally. Pressure of the other hand against the fundus aids this manipulation and especially if the presenting part is not engaged.

Fourth Manipulation:—When the presenting part is in the cavity or outlet of the pelvis, as it often is in the latter weeks of pregnancy and in labor use the following method: Stand at the side of the bed and face the patient's feet. Have the patient draw her thighs somewhat upward, her heels together and her knees apart. Enter the finger tips of both hands slowly and gently from above along the sides of the pelvis into the cavity.

WINCKLE'S METHOD:

"The part of the child at the fundus is fixed with the hand and then moved repeatedly backward and forward, while the other hand is ready to detect the movement thereby produced, and to distinguish the extremities of the child, their number, size and nature. Having succeeded in this, the upper hand next passes to the broad back of the child, and seizing it, the pointed end of the body is directed downward toward the lower segment of the uterus, and the head can then be found perhaps resting over the entrance to the pelvis."

ABDOMINAL AUSCULTATION.

The Patient's Position.—The patient should be straight, with the lower limbs extended, so as to bring the fœtus as close to the abdominal wall of the mother as possible. The patient's

abdomen should be covered with a sheet. Perfect quiet should prevail.

The Examiner's Position should be as easy as possible. kneeling or bending over the patient, with the head higher than the body. This prevents any error occurring from hearing the sounds caused by the induced cerebral congestion, and also keeps the ear at its normal acuteness. (aft. Win.)

THE METHOD OF AUSCULTATING THE ABDOMEN.

Place the ear first upon the farther, then upon the nearer side of the abdomen, and listen from the pubes to the fundus. and from the median to the axillary line. Listening only where you suppose the fœtal heart-beat should be best heard, is very liable to lead to grave error, for if you have made a mistake by abdominal palpation, you will probably not correct it by auscultation, as you can often hear the fetal heart-sounds all over the abdomen. The ear is better than the stethoscope because you can produce a more even pressure with your head than you can with a stethoscope, and therefore get nearer the fetus; and as the pressure of the head covers a larger area, it is not as painful as the stethoscope. (B. aft. Win.) Your position is easier. You can apply your head to the groin and lower abdomen. Those who prefer the stethoscope claim that it can be applied better to the groins and lower abdomen, especially if the latter is pendulous, and that it is better for examining areas close together. (aft. Win.) This statement is probably true, but I prefer immediate contact, and rarely fail to find the heart-beat. The examination should be made between "pains," but if we wish to note the effects of the uterine contractions upon the fetal heart-sound, we must also listen during a "pain."

By abdominal auscultation the following can be elicited:

1. The fetal heart-sounds.
2. The fetal movements.
3. The uterine souffle.
4. The funis and cardiac souffle.
5. The pulsation of the great abdominal arteries.
6. The intestinal sound heard in pregnant women.

7. Sounds caused by decomposition of the fetus.

8. Others less important are, (*a*) the shock of the aorta; (*b*) rubbing sound between the uterus and abdominal walls; (*c*) respiratory sounds; and (*d*) sounds from the maternal heart.

THE FETAL HEART-SOUNDS.

Clearness. If the fetal heart-sounds are not easily heard, (1) let the head rest lighter upon the abdomen, for too much pressure often not only lessens the sense of touch, but also that of hearing; (2) press firmer with the head, so as to bring the abdominal wall in contact with the fetus; (3) turn the patient first a little on one side and then on the other, so as to get at the sides of the abdomen better; (4) place a hand beneath the fetus as far as possible, and lift the fetus up against the abdominal wall (aft. Win.); or (5) grasp the breech, and pull it forward, and thereby bring the back closer to the abdominal wall (aft Win.).

THE SITE OF MAXIMUM INTENSITY OF THE FETAL SOUNDS.

This is generally situated opposite the cephalic end of the fetal trunk, and on the side of the abdomen corresponding to the back of the fetus; but sometimes the fetal heart-sounds are heard best through the anterior chest-wall of the fetus. The rule is, that the sound is heard best when the trunk comes in closest contact with the abdominal wall, whether it be the back or the chest of the fetus. (C. and S., and B.) Hence it is sometimes best heard through the breech. (C. and L., and B.)

The above facts are based on the following two laws: (1) The less distance a sound has to travel, the better it is heard. (2) A solid carries sound much better than a liquid. It must be remembered that the fetal heart-sounds can often not only be heard upon the whole of one side of the abdomen corresponding to the back of the fetus, but upon the other side also. The area of maximum intensity of fetal heart-sounds is about sixteen square inches.

RULES FOR DIAGNOSING THE PRESENTATION AND POSITION OF THE FŒTUS, FROM THE SITE OF THE MAXIMUM INTENSITY OF THE FŒTAL HEART-SOUNDS.

These rules are based upon the above statements, and hence may not always tell us positively the position of the fetus. In vertex presentations, the area of maximum intensity is heard on the same side of the abdomen as that in which the back of the fetus in situated, and below the umbilicus. (aft. P., Ash. and B.) In anterior positions, it is generally half-way on a line from the navel to the ilio-pectineal eminence, while in posterior positions it is situated half-way on a line between the navel and anterior iliac spine or the sacro-iliac joint. (aft. P., Ash. and B.) In face presentations, it is heard external to, and on a line with the umbilicus, and on the side of the abdomen corresponding to the abdomen of the fetus. (aft. P. and Ash.) In breech presentations, it is heard through the fetal back above the navel and on the same side of the abdomen as the trunk of the fetus. (aft. P.) In shoulder presentations, it is heard in the median line, below the navel, in all positions, but may vary some laterally, as the obliquity of the lie of the fetus. (B.) In twin pregnancies, the areas of maximum intensity are heard the same as in single pregnancy. There are two distinct areas of fetal heart-sounds, but sometimes, when both fetuses have the same position, the two heart-sounds may merge into one area.

THE FREQUENCY OF THE FETAL HEART SOUNDS AND THE DIAGNOSIS OF SEX.

Wilson places the frequency from 110 to 170 per minute and gives the average as 134. Crede and Leopold give the frequency as 130 to 140. Wilson's limit seems rather wide for a normal labor, because a pulse of 100 or 180 is considered to call for immediate delivery. (aft Buchtel.) If the fetal heart sounds were properly listened to, the still-born death rate would be materially lessened. (B.) According to Wilson we are justified in stating that a pulse above 134 indicates a female heart, while below indicates a male, and that a pulse above 143 is due with almost certainty to a female heart while one below 125 is due with the same certainty to a male heart. It must be re-

membered that a large female fetus will have as slow a pulse as a male fetus, and that a small male fetus will have as fast a pulse as as an average female fetus. Hence we are liable to error, and although I have made several correct diagnoses I rarely try to diagnose the sex as it is of slight practical importance, except to surprise the patient and her friends by your mysterious powers.

The Character of the Fetal Heart Sounds—This is identical with the sounds of the new born baby's heart, and if we wished to become accustomed to the fetal heart sounds we need only to listen to an infant's heart. To say that fetal heart sounds resemble the tick-tack of a watch is absurd. Students go to cases with this idea in their heads and then wonder why they don't get the fetal heart sounds.

Diagnosis of the fetal heart sounds is easy, but they must be diagnosed from the maternal pulse, (this is generally easy by comparing the two as their frequency is so far apart), and the pulsation of the uterine or abdominal arteries. (This mistake is only liable to occur when the fetal heart has only been heard a few times, and is easily told by taking the maternal pulse.)

Value of Listening to the Fetal Heart Sounds:—The fetal heart sounds inform us that the fetus is alive, whether there is danger of fetal asphyxia and aids in diagnosing presentation and position of the fetus, the sex of the fetus and twin pregnancies.

NOTE:—For the time when the fetal heart sounds can be first elicited, the situation of the stethoscope in the early months, and the causes which influence the disturbances of the fetal heart sounds you are referred to the subject of early pregnancy diagnosis.

FETAL MOVEMENTS OR FETAL SHOCK.

The sound produced by movements of the fetus is called fetal shock and is generally studied under the diagnosis of pregnancy, but we will here state that it is of two kinds. The first is caused by the moving of the whole fetus, and is rubbing in character because the fetus rubs against the uterine wall.

(aft Wil.) The second is caused by the motion of the fetal extremities and is like a stroke (aft Wil.) or a gentle tapping. (aft. C. & L.) Fetal shock is not only preceived by the sense of hearing but also by the sense of touch, i. e., we feel the motion with our ear or head. It is of value because it proves that the fetus is alive and may aid us in diagnosing the presentation and position of the fetus.

The Uterine Souffle.—This also belongs to the diagnosis of pregnancy, and therefore, we will here only state a few points in which it relates to labor. (B.)

Wilson claims that by the uterine bruit you can (1) diagnose true from "false" pains, because during a uterine contraction it first becomes intensified, then disappears to reappear when the uterus relaxes; (2) that the separation of the placenta can be diagnosed by the uterine murmur, for "we hear a distinct tearing sound and then the bruit ceases"; and, that (3) the site of the placenta can be diagnosed because the site of the maximum intensity is the same as that of the placenta, and therefore it is of value in adherent placenta.

THE PULSATION OF THE UTERINE ARTERIES.

This sometimes produces a sound like the tapping of a fœtal extremity. (See "Palpation," "Pulsation of the Uterine Arteries."

The Funic Souffle.—If heard during labor, its frequency, intensity, area of transmission, duration and changes should be noted. Its diagnosis from the uterine souffle is easy if you note its frequency, but it is not so easy to diagnose it from the cardiac souffle. In the latter case the diagnosis is based on the situation of sound and as to whether it is continued, as if it followed the cord, or not. (Theory B.) See "Diagnosis of Pregnancy."

The Cardiac Souffle.—See the "Diagnosis of Pregnancy."

THE PULSATION OF THE GREAT ARTERIES IN THE ABDOMEN OF THE MOTHER.

This pulsation is a regular, dull beating, synchronous with the maternal wrist pulse. (C. and L.) It is not always present. (C. and L.) It is heard especially at the upper left and right portions of the abdomen. (B.)

THE INTESTINAL OR GURGLING SOUND HEARD IN THE BOWELS OF PREGNANT WOMEN.

It is cooing or hissing in character, caused by the accumulation of gas in the intestines, and is easily diagnosed from other sounds. (After C., L. and W.)

THE SOUND CAUSED BY THE DECOMPOSITION OF THE FŒTUS.

It is "a fine crackling noise caused by the gases generated passing through the tissues." (Wil.) It can be distinctly heard if you press upon the dead fetus. It indicates that the fetus is dead and undergoing decomposition. (Wil.)

OTHER SOUNDS.

These have been mentioned, and simply have to be excluded.

THE MANAGEMENT OF RETAINED PLACENTA.

G. H. STOVER, M. D., EATON, COLO.

In thirty-seven of my obstetric cases I have notes recording the conditions present in the third stage of labor. In nineteen of these is stated the numerical sequence of the pregnancy. In ten instances the placenta was retained; meaning that a fair trial of Crede's method was unsuccessful in delivering it. Of eight cases known to be in primiparæ, there was retention of the placenta in four; in one of these, beside adhesion, there was also hour-glass contraction of the uterus. Of four known secundaparæ, retention occurred in two. In four known tertiaparæ, the placenta was not retained. In three who had borne more than three children, two had retention of the placenta. One of these, who had had ten children, also had hour-glass contraction of the uterus. In the eighteen cases of which I do not know the number of the pregnancy, two had retained placenta. The retention was, in all, due to adhesion of either the placental body or the membranes to the uterus.

Thus, in the thirty-seven cases noted, there was retention of the placenta in ten. The majority of these occurred in primiparæ, which is rather strange if we accept the statement that

adhesions are usually the sequence of a past endo-metritis. Ten out of thirty-seven is a very large proportion, but it is probable that more complete notes of a larger number of cases would considerably reduce the ratio.

"Cases of so-called placental retention are often simply the result of injudicious management," says Lusk. In order to place my report upon a proper footing, I will say that in no case has Crede's method of expression failed in my hands to speedily dislodge and extrude the placenta, unless well-marked adhesions were afterward found; indeed, I have reason to believe that minor adhesions will be overcome by it. It is a simple operation, and, with the direction of the axes of the uterus and vagina borne in mind, the competent operator should experience no difficulty in its performance. I have several times been called to cases where a midwife was in attendance but had failed to deliver the placenta, by, as she stated, "pressing on the womb and drawing on the cord." Crede's method was unsuccessful in but one of these, and here the placenta was found to be adherent. The remainder of these cases were not counted among those of retention.

I might also state that I did not consider it my duty to enlighten the midwife as to the proper method of placental delivery, either.

In only one or two of my cases has there been adherence of the membranes. I believe that the adhesion has been in the neighborhood of the right cornu in at least six of the ten instances, though my notes do not always mention this point. In but one was there any hæmorrhage, and it was merely trifling in amount, and ceased as soon as the uterus was empty.

The method I pursue is as follows: After the delivery of the child and severing of the cord, I make sure that the uterus is not relaxed, by feeling it through the abdominal wall. Then I myself wash the infant's face about the eyes, instil the nitrate of silver solution, and return to the mother, after instructing the nurse or attendant not to interfere with the region of the eyes when oiling the infant. I wait ten or fifteen minutes for the voluntary expulsion of the placenta. If this does not take place soon, or if there is any hæmorrhage, Crede's method is ap-

plied for a few minutes. I never pull upon the cord until the placenta is fully within the vagina (if I do so at all), for I regard the procedure before this time as usually useless and unnecessary, and always discreditable. Except in the rare condition of marginal implantation of the cord, traction upon it tends to place the placenta in the most unfavorable position for extrusion, and should the placenta be extensively adherent, might break the cord near its origin and lead to annoying hæmorrhage.

If Crede's method is not successful, I cleanse the external parts of the patient with bi-chloride solution, repeat the vaginal douche, and after preparing my hands as carefully as if for a laparotomy, and lubricating the back of one of them with as little as possible of clean carbolized vaseline, insert it into the womb. This is neither difficult nor painful if gently and slowly done. Keeping the fingers *outside* the membranes, the adhesions are located and broken up, using the first two fingers and the thumb also if need be. Detachment being complete, the placenta and membranes are withdrawn by the fingers, compression also being made by the other hand, which has been all the time supporting the womb through the abdominal wall.

When the adhesions have been extensive, a hot intra-uterine douche of carbolic acid or creolin solution is given, and followed by washing out of the vagina.

Anæsthesia is produced only when the operation presents difficulty.

Hildebrandt advises that the fingers be kept inside the membranes while removing adhesions. This is supposed to protect the uterine walls from infection by the hands. When I put my hand into the uterus, it is clean enough to satisfy my surgical conscience, and I do not wish the fingers to be muffled by membrane.

Neither do I ever delay an hour nor a few hours for the placenta to "loosen itself and come away," but proceed early to remove, for the very good reason that after the child is born the function of the placenta is ended and it is then a foreign body, prone to excite hæmorrhage, and on account of its structure and contents, extremely liable to become infected, and every hour it becomes a greater menace to the safety of the patient. I consider

that the greater safety attained by its removal more than balances the disadvantage of the very slight violence of manual extraction.

In case the retention is due to hour-glass contraction, if the condition is not very marked, it is easily overcome by the hand in an interval between pains, but if it is extreme, give chloroform to anæsthesia, and gently, but efficiently dilate, inserting first the tips of the fingers and then the body of the hand, when the placenta may be removed.

Briefly summed up, the points to be noted are:

The failure of properly-applied external manipulation is almost surely diagnostic of adhesion, and indicates manual extraction.

Anæsthesia is not usually necessary.

Of the greater importance is the most painstaking cleansing of the operating hand and of the parts related to the site of operation. In some cases it might be well to clip part of the hair from the vulva, but shaving is hardly needed, and probably the majority of patients would very decidedly object to it for this operation.

As to results with this method: The period of confinement to bed has never exceeded that which follows normal labor. There has never been the slightest evidence of septic intoxication or infection, and during the progress of the case it has never been necessary to give an intra-uterine douche for the purpose of washing away the source of a mal-odorous discharge, and in no way can I see that the puerperal period has differed from the uncomplicated puerperium of ordinary labor.

The successful outcome of these cases must be regarded as almost wholly attributable to the practice of cleanliness.

SYMPHYSIOTOMY.

T. E. TAYLOR, M. D., DENVER, COLO.

Since the recent revival of the almost forgotten operation of symphysiotomy a few years ago, the cases reported have multiplied, and the technique has been perfected, until we are rapidly getting into a position where we can define the limits within which it is justifiable. Until this is done, every operation should be reported, as the larger the number of cases recorded, the less is the likelihood of error. Having recently had a patient who was delivered by this means, I take this opportunity to report the case.

Mrs. G., aged 33, German, sent for me early in the morning of March 6. I saw her at 7 A. M., and was told that she had had strong pains all night, labor having set in at 2 P. M. the previous day, and the membrane having ruptured at 10 P. M. I was also told that her previous labors had all been difficult, all of her four deliveries having been by craniotomy.

Upon making an examination, I found the os thoroughly dilated, the vertex presenting in the first position, and the head so firmly crowded down into the inlet that I could not reach the promontory of the sacrum, though the ease with which I reached the upper segments of the sacrum indicated that its promontory would be within reach were the head out of the way. Upon taking the customary external measurements, I found the following dimensions: Spines, 10½; crests, 9½ inches; external conjugate, 6½ inches. Two weeks after delivery I found the diagonal conjugate to measure 3¼ inches, giving me an estimated true conjugate of 2⅝ inches.

Although satisfied from the measurements of the pelvis that there was no possibility of a head approaching the normal in size, passing through it, this conclusion being confirmed by the history of successive craniotomies, yet, as the surroundings were most unfavorable for any operation, and as the patient was very averse to going to a hospital, or indeed, to undergoing any operation at all, I put on the forceps to give her the benefit of any chance that the head might be small and compressible enough to pass through the contracted inlet. The forceps were applied

without difficulty, but strong traction, applied with intermissions for half an hour, failed to produce any effect. It seemed evident, therefore, that an operation was inevitable, and she was persuaded to go to St. Luke's Hospital for this purpose. Dr. Parkhill was called to my assistance. Dr. Parkhill agreed with me that symphysiotomy was the preferable operation, though the conditions were not what we should have liked, as the woman had been in labor already twenty hours, and ten hours had elapsed since the membranes had ruptured, she being, during this time, in the care of a most ignorant and dirty midwife, who had made frequent examinations. I confess too, that the preliminary application of the forceps, though authorized and even insisted upon by some, was hopeless and ill-advised, and had an unfavorable bearing on the prognosis. It must be remembered, however, that at this time I had not been able to measure the diagonal conjugate, and consequently could not know how great the contraction was, estimates founded upon the external conjugate being very unreliable,

At the hospital, the abdomen, thighs and vulva were shaved and thoroughly disinfected, as for any operation, and the vagina was also thoroughly disinfected. Dr. Parkhill operated by the open method, dividing the symphysis from before backward with a bistoury. As so often happens, the symphysis was not in the median line, but a little to the left. Upon dividing the symphysis, the pubic bones separated about an inch and a half: the separation, as the head passed through the inlet, reaching two and a half inches. The labor was at once completed by the application of the forceps, only moderate traction being necessary. The child was asphyxiated, but was soon resuscitated. The patient recovered without noteworthy incident, leaving the hospital on the ninth day, and within three weeks resuming her household duties and the care of the baby. There is no perceptible movement of the pubic bones, and her gait is as secure as formerly.

This result was very gratifying in comparison with the bloody record of four successive craniotomies. The question arises, was it the best possible operation to do. At our meeting last year, a successful case of Caesarian section was reported,

and to some it way seem that the latter is the more promising operation. Looking into the the statistics of the two operations, we find that the results in both depend largely on the period covered, and the operators concerned. If we go back fifteen or twenty years, before the days of aseptic surgery, and when the indications calling for them were not well understood, we find both operations alike unsatisfactory. To resort to them when every other hope has failed, and when the mother is already exhausted by a long and fruitless labor, is not fair to these operations, and the resulting mortality is not so much the mortality of the operation, as the mortality of prolonged labor. The true mortality of symphysiotomy, as of Caesarian section must be computed from these cases alone when the measurements have been carefully taken and the most suitable operation undertaken as a matter of election, not as a last resort, and where every precaution has been taken to avoid sepsis. Tried by this standard, the earlier cases down to 1880 must be rejected as a whole; and of the cases reported since that time, while the field of the operation was ill-defined. a large part, including most of the fatal cases, must also be thrown out, as they were either performed after labor had continued a long time, or the conditions were such as to make symphysiotomy unsuitable, or death was due to some complication unconnected with the operation itself. What the results of symphysiotomy, thus revised, may be, is seen by the statistics reported by Spielli in the Annales de Gynaecologie and translated by Dr. E. Gustav Zincke for the Ohio Medical Journal for April, 1895, where of twenty-three cases operated on by Morrisani, Novi and others, all the mothers recovered, and only one child died twelve hours after the operation. Similarly Grandin and Jarman state that of the four deaths occurring in the thirty-one cases operated upon in the United States up to March, 1894, in not a single case was the operation elective, being only performed after the patient was already largely exhausted; while of the nine fœtal deaths, eight would not have occurred if the operation had been elective. Even the best statistics of Caesarian section cannot equal these results, so that the conclusion seems warranted, that where the pelvic contraction is not below the limits of successful symphysiotomy, it

is not only the less formidable operation to the patient, but it is really less hazardous. Beyond these limits the combination of induced premature labor and symphysiotomy is feasible, but will not usually give as good results as Caesarian section.

The limits within which symphysiotomy is feasible are pretty well determined, extending from the limit of a safe delivery by forceps with a true conjugate of about three and one-half inches down to a conjugate of two and one-half inches. It is unsafe to allow the pubic bones to separate more than three inches lest the sacro-iliac joint be injured. This gives us a gain of about three-fifths of an inch in the true conjugate; but as the transverse diameters are increased much more than the conjugate, there is plenty of room for moulding the head, so that the entire gain by the operation is equal to a gain of one inch in the true conjugate.

As to embryotomy, does it not seem that it is time to say that this operation is not justifiable if the child is living? Granting that we should attach more importance to the safety of the mother than of the child, when we have an operation that is as safe for the mother, and which usually saves the child. how can we hesitate as to our duty! Of course, the patient and friends must consent to the operation, and they may refuse to allow a symphysiotomy, but this does not justify us in destroying the child, any more than her earlier preference for abortion would have justified us in resorting to this means, for relief of the nausea of pregnancy, when not justified by the necessities of the case.

DISCUSSION.

DR. J. M. PERKINS: Just before the confinement of this same patient, I attended her neighbor in confinement, and because her neighbor got along so well, she thought of course I must attend her, and that she would get a nice live baby; so she called me in and wanted to engage me. I inquired about the history of other confinements, and she told me of Dr. Burns attending some of the other confinements. She said the babies' heads were either mashed or cut to pieces. I asked for an examination, which she consented to. I found the pelvis so

narrow and so contracted that I did not feel like undertaking the case in the ordinary way, and I told her so, and advised her going to the hospital immediately, as her time was nearly up according to the count. She would not consent to that, but insisted on my attending the case, and attending to getting her a live baby, and I refused positively to have anything to do with the case. She said she had a notion to call in a midwife, and spoke of a woman she could get. Well, I thought if she compared midwives with doctors, she could do as she liked; but I advised her not to call in a midwife. Then she wanted to know if I would come to help her at the time of the confinement, in case she called a midwife, and the midwife could not get a live baby; I told her, no, I would not; that I knew what ought to be done, and if she would not consent to what should be done, I would not consent to help her in something that ought not to be done; and so that was the way I left the case, and I learned afterwards that she was taken to the hospital. I didn't learn all the facts until I heard them here to-day. I am glad that she finally got a nice live baby, and she is pleased, I suppose, now.

DR. BURNS: I was present at the last two confinements of this patient. She has had five births previous to this symphysiotomy. In all, the forceps had to be used with such compressing force that the children were still-born. During her fifth pregnancy the attending physician proposed premature labor. This the patient did not allow to be carried out. The trouble with this class of patients (poor and ignorant Russian Jews), as a rule, is to get them to do as you wish.

After reading Pinard's paper in '92 I have been much in favor of symphysiotomy in preference to the Caesarean Section or Porro's operation. The mortality rate in Denver will prove the value of symphysiotomy over the other operations. In the last two years there has been at least three of the other operations with the following results: first, mother and child lived; second, mother lived but the child died; while the third, mother and child died. Symphysiotomy performed once, i. e. Dr. Taylor's case, mother and child alive and well.

I have performed symphysiotomy on the female cadaver and upon live dogs and believe that the open method to be much less dangerous than the closed.

DR. PARKHILL: I had the pleasure of looking after the surgical side of this case. There is but little to report in addition to what Dr. Taylor has stated. The external method was adopted in the operation, and in my opinion it is the preferable method. The pubic ligaments were re-united by means of strong catgut sutures, while silk-wormgut was used for the superficial wound. No drainage was used. Over the dressing a tight band of adhesive plaster was thrown around the pelvis. The wound was dressed but once, on the eleventh day I believe when the sutures were removed and perfect union found. From a surgical standpoint the woman made a very excellent recovery.

INFLAMMATION OF THE UTERINE APPENDAGES (SALPINGITIS).

SOL G. KAHN, M. D., LEADVILLE, COLO.

Every practitioner is aware of the fact that the present century is full of changes in the theory and practice of medicine. Perhaps in no branch of our science has more been done for the alleviation of human suffering than in that pertaining to diseases of women; and to the consideration of one of these, I, for a moment, invite your attention.

As we are informed by Pozzi: "In the attempt to understand the connection between the uterus and the Fallopian tubes, it must be borne in mind that they have a common embryonal origin. At the end of the second month of intrauterine life, Muller's ducts fuse inferiorly to form the uterus and the vagina, while they remain distinct above, and constitute the tubes. The latter are in reality only the slender prolongation of the uterine cornua. There is an immediate continuity between their different coats, from which arises the possibility of an ascending salpingitis consecutive to an inveterate cystitis. The ovary connected to the tube by the tubo-ovarian ligament is in almost immediate contact with its pavilion, and may be infected

by contiguity. These organs are also united by important vascular and lymphatic connections. I need scarcely remind you of anastomoses of the utero-ovarian arteries and veins with those of the uterus; still more important are the lymphatics. There is a remarkable lymphatic group occupying the space between the tube and the ligament of the ovary; important relations completing the already close anatomical connections are thus established between the ovary and the tube. Thus there is, so to speak, no ovaritis without salpingitis, and no salpingitis without ovaritis; the inflammations of the appendages are then properly combined in the same description. Almost always the inflammation passes from the tube to the ovary directly by contact and by adhesion. But sometimes there is also observed a suppuration of the ovary without continuity with the inflammation of the tube. This fact can, then, be explained by the lymphatic relations. The vessels which come from the pavilion follow the external ligament and empty into the large lymphatic plexus called the sub-ovarian plexus. There is then no difficulty in comprehending that an abscess of the ovary may be observed. With relatively small lesions of the oviduct, the adhesions, which are rich in lymphatics, may serve to carry the inflammation. The lymphatic network, which covers the surface of the ovary, also communicates extensively with that of the peritoneum. If, then, the peritonitis consecutive to inflammation of these organs usually remains circumscribed, it is, without doubt, because an early stage of the process consists in a plastic obliteration, a sort of adhesive lymphatic thrombosis. Finally, the sub-peritoneal cellular tissue that exists in the wings of the tube and of the ovary, is in connection with that of the broad ligaments, which is itself continuous below on the pelvic floor and on the sides with the lamellar tissue, folding in with the peritoneum, and offering a special laxity in front of the bladder, in the pseudo cavity of Retzius. The knowledge of these peculiarities is indispensible for the explanation of the deep and the superficial propagation of the inflammation."

The importance of the subject and the frequency of the disease may be inferred from the fact that Winckel, out of five hundred autopsies made on women, found three hundred of

them to have had salpingitis of a greater degree or less. Three have been many classifications of salpingitis described. The one to which reference will be made in this paper is that formulated by Dr. H. J. Garrigues and given in his text book on Diseases of Women.

Different forms. It may be acute catarrhal or acute purulent, both of which are seated in the mucuous membrane and are therefore called endosalpingitis; or it may be chronic interstitial, which is also called pachysalpingitis, mural salpingitis, or parenchymatous salpingitis and is located in the muscular coat. Salpingitis may be cystic and, according to the character of the fluid contained in the dilated tube, it is called pyosalpinx, which is filled with pus; hydrosalpinx, which contains a watery fluid; and hematosalpinx, the contents of which are bloody. Perisalpingitis is the inflammation of the peritoneal covering of the tube, a condition which only occurs as part of a more extended pelvic peritonitis.

Profluent salpingitis is a variety characterized by the discharge of a watery fluid, pus, or blood from the tube through the uterus and vagina. When the fluid is watery the disease is also called hydrops tubae profluens or intermittent hydrocele of the ovary.

Under the name of salpingitis, isthmica nodosa has been described, a form of chronic salpingitis in which nodules can be felt at the corners of the uterus. In their interior is found the tubal canal, hyperplasia and hypertrophy of the muscular elements of the wall, and sometimes cysts.

Pyosalpinx saccata is a variety of pyosalpinx in which the lumen of the tube is partitioned off into a series of pus-filled sacs, which partitions may subsequently become absorbed so as to form one cavity. Taking the etiology as base for a classification, salpingitis may be divided into infectious and non-infectious. The non-infectious is always catarrhal; the infectious is nearly always purulent, but may, in the beginning or toward the end of the disease, be catarrhal.

The causes of salpingitis in many cases cover a multitude of sins and imprudencies; either produced by the woman herself or someone else. Gonorrhœa and septic infection, cause

the greater number of cases. Abortions, which are complete or incomplete, cause many cases also, which sometimes do not manifest themselves for several years; endometritis, metritis, too frequent coition, exposure to cold just prior to and during menstruation, exanthematous diseases, syphilis, tuberculosis and frequent douches of cold water. Last, but not least, any manipulations of the cervix or uterus without surgically clean hands or instruments. The symptoms are many and varied. When seen in its first stages the patient may only complain of a peculiar discomfort of the external genitals, urethra and uterus on one or both sides. Pain may be slight or severe; referred to the sacral and lumbar regions or down the thighs, also in the iliac fossa and epigastrium, exaggerated by undue exercise. Sometimes they have pain caused by the tumor pressing on the nerves in the pelvis. Pain more or less severe during defecation, which does not occur daily with these patients, who usually suffer from chronic constipation as an adjunct to their other troubles. Some only complain of pain during coition. Menstruation may be profuse and irregular, the pain becoming more severe at that period. Some of these symptoms may be and are frequently overlooked and the patient treated for hysteria and dosed for months, and the knowledge of the real trouble escaping the attention of the attending physician, and should a few drops of pus from the fimbriated end of the tube escape into the abdomen, thereby setting up a pelvic peritonitis, the cause of which might still escape the attention of the medical attendant should a vaginial examination be neglected.

As regards treatment: It is well for us to remember, in this connection, that every case of metritis in every instance, whether specific, septic or non-septic, will sooner or later extend to the tubes, causing salpingitis. Therefore, the most important treatment is prevention. If all cases were recognized before the tubes are involved and properly treated, we would have very few cases of salpingitis. When a salpingitis is acute the usual palliative measures of cold applications to the abdomen with hot vaginal injections, absolute rest in bed, a fluid diet and salines are employed, and opium to relieve pain. But it is the subacute and chronic cases which cause us the greatest

anxiety and make confirmed invalids of our patients, which we wish to consider. It has become quite a fad to remove all diseased tubes, but a great many tubes can be saved by palliative treatment, if properly carried out. Numerous cases may be seen which were due to endometritis, cured by curetting the uterus and then treating the diseased tubes locally; and also where an eroded and enlarged cervix is found with salpingitis, a great advantage may be gained by treating with applications of a 5 per cent. solution of aluminum acetate. The best local treatment perhaps is to use 10 per cent. ichthyol glycerine tampons in the vagina twice a week, at the same time employing hot vaginal injections twice a day. In chronic cases have them use a pessnitz at night and remove it in the morning; also frequently paint the posterior vault of the vagina with iodine. Sometimes a better result will be obtained by confining the patient to her bed for a week or two, giving her hot vaginal injections three times a day and introducing the ichthyol tampons every night. Electricity has been recommended, but it may be doubted if the value has been proven; also massage. If massage is to be used, it should only be in chronic cases, for the reason that if used where there is any inflammation, it will aggravate it. If none of these measures cure or relieve the patient, then the question of removing the tubes may be considered. Laparotomy has always been the extreme measure employed. But recently the operation of vaginal hysterectomy has been advocated and substituted by Drs. Polk and Boldt, of New York, in cases where both appendages must be sacrificed, as ascertained by the history and examination.

The following report of two cases are selected from a number of similar ones, treated agreeably to the course laid down in this paper:

On August 7, 1894, Mrs. Emma S., aged 30 years, applied to me for treatment. Family history good; commenced menstruating at the age of 13 years; always regular and free from trouble at those periods; pregnant three times, carrying her children to full term. In the month of May, 1892, she was delivered of a healty child at full term. Her trouble dates from that time. Complained of pain at period of menstruation, on

left side and in back; nausea at irregular intervals, accompanied with diarrhoea; constant feeling of lassitude, all of which incapacitated her from performing her household duties. On bi-manual examination, I found the left tube and ovary painful to touch and enlarged to the size of a goose egg; temperature of vagina elevated, with inflammation of entire pelvis. Discharged from treatment October 9, 1894. Treatment consisted of the introduction of ichthyol tampons twice weekly, with a general tonic. Patient reports herself, May, 1895, entirely free from her former trouble, from date of discharge.

On February 27, 1895, Mrs. Kate T., aged 34 years, came under my treatment. Menstruated at 13 years of age; married when 21; has three living children. In July, 1894, aborted at six weeks, from which date she has suffered from the following symptoms: Pain referred to left side; menstruated profusely at irregular periods; on bi-manual examination found an enlarged left tube; speculum revealed an enlarged and eroded cervix. Treatment: Application of aluminum acetate to cervix, followed by introduction of ichthyol glycerine tampons. Patient discharged from further treatment April 30th, since which time she has been free from pain and irregular menstruation.

THE ÆTIOLOGY, PATHOLOGY, SYMPTOMATOLOGY AND TREATMENT OF SOME OF THE DISEASES OF THE UTERINE APPENDAGES.

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Comparatively speaking, our knowledge on this subject, up to a few years ago, was of a very meager character; but at present it has reached very definite lines, especially in regard to etiology and pathology. It will serve my purpose to speak only of ovaritis, salpingitis and pelvic peritonitis.

Ovaritis may be the result of pelvic peritonitis, of salpingitis, or of periovaritis, and in any case is due to the extension of an inflammation from the uterus or tubes, except in rare instances where there has been a rupture of some part of the alimentary tract. As a result of a purulent endo-metritis, a

small amount of pus escapes into the pelvic cavity at the free end of the tube, and immediately inflammatory processes begin. Lymph is thrown out in the immediate neighborhood of the ovaries, sometimes covering them, and this becoming organized, the ovarian tissue, nerves and vessels are pressed upon, producing pain and the natural consequences which must follow such a condition. When the ovary is covered with this organized lymph or inflammatory new formation, we can readily understand the dysmenorrhœa which we find accompanying ovulation in cases of ovaritis.

Salpingitis is due in 99 per cent. of cases to the extension of a purulent endo-metritis into the tube, and slowly but surely causing destruction of its lining. The Fallopian tubes consist, as you all know, histologically speaking, from within outwards, of a mucous membrane which is lined with ciliated epithelium. This membrane is in folds, and seems to completely fill the calibre of the tubes. The next layer consists of circular and longitudinal muscular fibres, and outside of this is the peritoneal covering. Between each of these layers there is a very limited amount of cellular tissue. Each tube might almost be said to be a continuation of the uterus, beginning at the cornu, and ending in a free, fimbriated or fringed end. Thus we see that we have a really free passage into the abdominal cavity from the outside, without piercing any tissue.

There are no glands in the tubes and when an inflammation starts it must be due to some cause outside the tubes, such as the entrance into them of pus or other irritating matter from the uterus. Now, if this irritating matter could be confined to the tube and the uterine end remain open, it would not cause so much trouble. But what happens? The uterine end becomes inflamed, it is denuded of its epithelium, and owing to the superabundance of mucus membrane, the raw or denuded surfaces are kept in close contact and the opening becomes closed, while all this time the pus producing germ is keeping up its work of destruction. A larger and larger amount of pus is being formed, and passing to the free end of the tube, a drop escapes into the pelvic cavity. Now a new condition of things arises. Nature at once sets about to cover up this intruder, this

disturber of peace, and destroyer of tissue. Lymph is thrown out and covers up the offending substance; but unfortunately it has in itself a means of increase, and it takes advantage of its possessions. In the large majority of cases the free end is not at once blocked up, but still has the opportunity of discharging its pus into the pelvis, and with each new discharge, new inflammatory material is thrown out, new adhesions formed, and the trouble is intensified. If at the time a follicle in the ovary ruptures and discharges an ova, a drop of pus is set free in its immediate neighborhood, we can all readily see how an ovarian abscess, is almost a certainty. But there are other conditions which may and often do arise. The uterine end of the tube, may remain open while the free end becomes closed and thus the pus, which in the former case, was discharged into the pelvis, is discharged into the uterus, and the true trouble is not recognized, but the patient is treated, if she is treated at all, for purulent endo-metritis. Again, both the uterine and the free ends of the tube may become occluded and we have the tube converted into a true abscess, which frequently becoming overdistented bursts into the pelvis, producing peritontis and death.

Sometimes the tube becomes inflamed from the entrance into it of irritating matter which contains no pus germs, and if then both ends become occluded we have a true hydro-salpinx. If the uterine end should remain open, there would be periods when a flow of a watery character would be complained of by the patient, constituting what might be called intermittent hydro-salpinx. Some writers describe a haemato-salpinx, but this condition to my mind properly belongs to ectopic gestation.

There is no doubt but the pelvic cellulitis of former years, was always a pelvic peritonitis except it was traumatic in origin. Again, I will venture to assert, that inflammation of the pelvic viscera is always due to the escape into the pelvis of some irritating substance from the uterus, bladder, alimentary canal or parieties and that no case of peritonitis exists unless some foreign body gains access to the peritoneal cavity.

One of the chief symptoms of diseases of the appendages is pain. This is variable according to the amount of disease which exists. When there is not a greatly diseased condition

the pain may only appear at or about the menstrual period, last three or four days, and be quite bearable; but if the disease is extensive, the pain makes its appearance ten days or two weeks before the menstrual molimen, and continues till the flow is well established, or even longer; and in such cases it may be well-nigh unbearable. In most cases there is more or less constant pain in the pelvis, which increases in severity as the period approaches. The pain is usually referred to the side most seriously affected, and extends down the limb. Frequently the patient will complain of a pain in the heel or knee, or both. The pain in the pelvis is described by the patient to be a tearing pain, or a pulling, dragging pain, or as if some one were drawing the parts together. Usually there is pain on coitus, which is so severe as to preclude the marital act. The hæmorrhage at the period is usually increased, especially in chronic ovaritis. In pyo-salpinx or hydro-salpinx the flow does *not* seem to be increased in quantity. In intermittent hydro-salpinx or pyo-salpinx we have the occasional flow of a watery or purulent fluid from the uterus.

The physical signs are not always easy of demonstration. In many cases, on making a careful bi-manual examination, we will find the ovaries enlarged and bound down behind an immovable uterus, and there will be tenderness on pressure. Again, the ovaries may be in a more nearly normal position, but enlarged, tender and adherent, and the tubes enlarged. Frequently we will find the uterus immovable, and on both sides and posterior a mass of inflammatory tissue, in which it is impossible to detect the ovaries or tubes. In many cases a true diagnosis can only be made with the patient under an anæsthetic, and then examining per rectum.

The prognosis depends upon the condition existing. In many cases of diseases of the adnexa there is no immediate danger to life; but the constant pelvic pain, with what might be termed acute exacerbations at the menstrual nisus, renders the life of the patient miserable, and places her on the list of chronic invalids. If a pyo-salpinx exists, there is constant danger of its setting up an acute and fatal peritonitis. Hydro-salpinx may cause the same fatal results, but is not so likely to

do so. When operation is resorted to, the prognosis is usually good, except in acute cases, where there is pus free in the cavity of the pelvis, or a condition of active general peritonitis existing.

TREATMENT.—That there exists wide differences of opinion between medical men on this very important subject, there can be no doubt; and in many instances the reasons given for these differences are of a somewhat sentimental nature, and should not receive the support of any true medical mind for one instant. I will endeavor to give the treatment of diseases of the adnexa by laying down negative lines, for really each case must be treated on its own merits, and no strict lines can be followed, but general surgical principals ought always to prevail.

The prevention of these diseases is by far the most important, and in the light of our present knowledge of the causation of ovaritis, salpingitis and pelvic peritonitis, there ought to be and doubtless will be, a marked falling off of deaths from these diseases in the future.

While it is true that there are some cases of chronic diseases of the adnexa permanently cured, by prolonged local and general treatment, without any operative procedure, yet these cases are almost wholly neuroses, and not due to any pathological change in the tissues themselves. I am not in favor of removing the ovaries from every woman who suffers from ovarian neuralgia or dysmenorrhœa, nor yet do I believe it is always well to remove these organs because the patient has attacks of hystero-epilepsy; but when the patient is a confirmed invalid during a week or ten days out of every month, and I find that the ovaries are permanently diseased in themselves, or by reason of the results of previous attacks of pelvic peritonitis, then the sentimental rot about unsexing a woman has no influence in determining the course I shall pursue.

"The sexual relations of a woman are three-fold: as a woman, as a wife, and as a mother," and in the large majority of cases where operative interference is indicated, the patient has been by the diseased condition already unsexed in two of these relations—her functions as a mother have been long destroyed, and the pain on coitus has long since precluded the marital act. But her sexual appetite is still present, and if the

removal of the ovaries destroyed this appetite we might, from the standpoint of the brute, hesitate; but the removal of the ovaries does not have this effect. In fact, the sexual appetite sometimes seems more keen after the removal of these glands than it was before. Another reason given by men high in authority is that it is not justifiable to remove a part because it is inflamed. Now this would apply if we could get at the inflamed part and treat it locally, just as we would an inflamed finger: but this we cannot do, and besides we must take into consideration the causation, as well as the condition of this organ when inflamed. I am not now speaking of congested ovaries, for there is a very wide difference between the two in relation *to* cause, condtion and effect. When we remember, as we recall through our knowledge of anatomy and pathology, what *the* actual condition is or must be to give us an inflamed ovary. there is no doubt left in our minds as to the proper course *to* pursue, if we have the best interest of our patient at heart. Then, again, we are told that it is a very dangerous operation. Well, yes; it is a dangerous operation; but where does the greater danger lie,—in opening the abdomen and removing a pus sac, or allowing that pus sack to burst into the pelvic cavity and set up a general peritonitis? Have you ever thought why it is that where one *man* dies of peritonitis fourteen women die of the same? Do you not think that if it could be computed by percentage of all women who have chronic diseases of the adnexa, that the let-alone cases which prove fatal would not far exceed in number the fatalities which follow operations for the relief of the same?

Conservatism is good and commendable, but when we allow a woman to go around with a pus cavity in her pelvis without telling her of the danger she is in and advising proper measures for its removal, and call that being conservative, then our knowlege of the meaning of words might well be subject to severe criticism.

If we find a pelvic abscess pointing in the vagina, and can be sure that without wounding any large vessels, or allowing any of the pus to escape into the pelvic cavity, we can reach and evacuate that pus, through the vagina, it is our duty to do so,

and thus save the patient from the grave danger of laparotomy and the graver danger of carrying that pus around until it bursts into the pelvis and ends the life of the patient.

Don't attempt to pass an electric current through the pelvic viscera of every woman who comes giving symptoms of pelvic disease, and call it being conservative. Don't attempt to curette the uterus without dilating the cervical canal thoroughly, and call that conservatism. Don't curette without first washing out the vagina, and afterwards packing the uterus with gauze, and think you deserve credit for being careful and conservative. Don't open the abdomen of every woman who complains of a pain in her side, and because you are through the abdominal wall, remove the ovaries whether diseased or not, and congratulate yourself on your conservative principles. Don't open the abdomen, and because the task ahead seems more arduous than you had hoped, close it up again without an attempt to relieve your confiding suffering patient, and then say, "see how conservative I am. I would not remove the diseased parts, because, well, because." Don't consider it being conservative to treat all cases of long standing purulent endo-metritis, with nothing but the classic boro-glyceride tampon. Don't advise laparotomy in all cases of diseases of the adnexa without first attempting some palliative measures. The primary cause of most of these diseases, being a diseased condition of the uterine mucosa, an attempt should always be made to relieve or cure that condition, and give nature a chance to repair damages already done, and failing in this, with no other recourse, do a laparotomy and prevent the further entrance of septic matter into the abdominal cavity, as well as remove the already diseased parts. This is easily said but not always so easily done, even when your patient submits to this grave and unpleasant operation. It is sometimes a difficult matter, to know just when to operate to obtain the best results, but it is generally accepted that in acute exacerbations of a pelvic peritonitis, it is best not to operate, except where the peritonitis has become general and the patient appears to be sinking, and then only as a dernier resort. Where there is every reason to believe that the cause is gonorrhœal in origin and the peritonitis is general, it is quite

useless to operate, for invariably the case ends disasterously. In the period between the acute attacks then, is the best time, and I do not think we are doing our duty by our patients who have had one attack of pelvic peritonitis, if we do not fairly state to them the gravity of their condition, but keep lulling them into a feeling of security, by making vaginal applications, which never yet cured a single case of purulent endo-metritis, much less prevented repeated attacks of pelvic inflammation.

The practice of applying to the interior of the uterus any escharotic without first dilating the cervical canal is highly reprehensible, and in a large majority of cases is productive of positive and permanent harm. In fact, I do not think that the amount of benefit arising from the application of escharotics, under any conditions, would warrant anyone in using them; but when we add to this the great amount of damage which is frequently done by their use, it leaves no room for question in my mind as to what place these substances hold in gynæcological work.

The treatment of these diseases with the electric current even in the hands of those understanding its therapeutic application, has not in any sense reached the sanguine expectations of its greatest advocates; in fact, it has in many instances done great harm; and then, when we consider the many who use it constantly, and have absolutely no knowledge of its therapeutics, can we wonder that sometimes the profession is brought into disrepute through the agency of many of those claiming standing room in its ranks? The advocates of this line of treatment claim altogether too much, and we can give the names of eminent men in the profession who gave it a fair trial and, after seeing the results, completely discarded it as often worse than useless, and always of doubtful utility.

DISCUSSION.

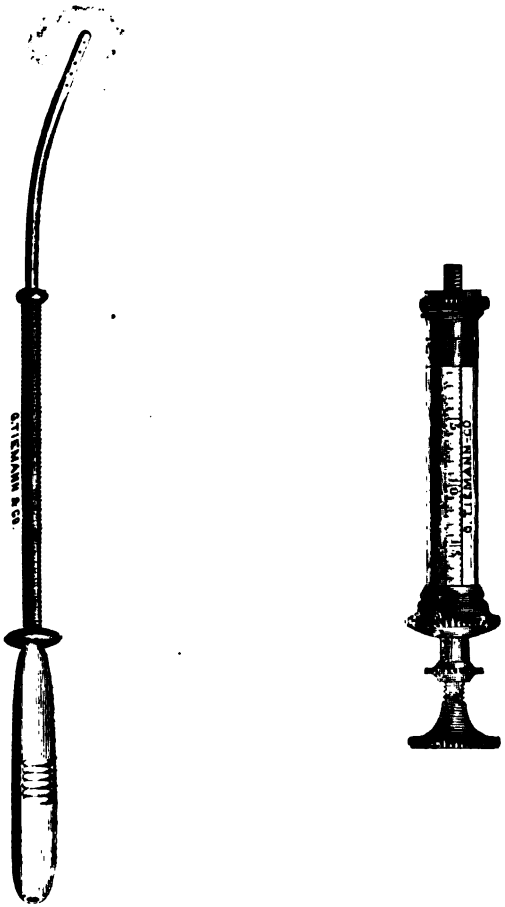
DR. HARRISON: Diseases of the uterine appendages are of vital importance to every medical man, and it is a grave matter with the patient. While much has been said and done in the matter, more especially during the last decade, it seems to me that a vital point that is actually neeessary has

been overlooked by most of the practitioners of medicine and surgery. The act of coition is not understood by the laity and they are not informed by their medical advisers as they should be. A great deal of distress and a great deal of sorrow and pain in domestic circles has been brought about because of the lack of their being informed by their medical attendant. While this is the case, and it is with some embarrassment, especially in some instances, we hesitate to undertake that responsibility, or rather, are inclined to pass it over, and let people find it out as best they can, yet that particular feature I would urge upon the minds of the physicians present, because I know the sorrow in domestic circles which it has caused, and been the fruits of great distress. I understood from the tenor of Dr. Kahn's remarks in his paper, that he did not approve of the application of such agents as might be termed, in one sense of the word, escharotics, but I have had the best of results with Churchill's tincture of iodine, and accomplished a great deal of good. I have aspirated for pus in several instances, and have failed to find it. However, I have no reason to regret having aspirated in any case. I do not approve of extirpating the ovaries. My experience has led me to believe that while, in many instances, great. good has been done, the statistics which I have gathered disfavor the indiscriminate extirpation of the ovaries.

DR. LEE KAHN: In this connection, I would like to present an instrument for uterine applications, which I have had made by Tiemann & Co., New York. It is an applicator and injector, consisting of an ordinary applicator, made of virgin silver, with an opening through its entire length, and a graduated one-drachm syringe to fit the handle. The uterine end of the instrument is perforated on either side and end, and the medicine is very evenly distributed on the cotton.

It is used the same as any other applicator, with this exception, that you apply nothing to the cotton, but draw what medicine you desire into the syringe, and after the applicator is introduced, the syringe is screwed to the handle, and the medicament injected onto the cotton. By using this instrument you avoid a very disagreeable feature, that of distributing the

medicine to be applied to the endometrium over the os and cervix, and in case it is desired to apply more than usual, as in swabbing the uterus after an abortion or a miscarriage, you do not have to withdraw the instrument.



It is manufactured by Tiemann & Company, 107 Park Row, New York, where it can be procured.

DR. STODDARD: Just a word in regard to escharotics. The habit of using escharotics in the interior of the uterus, as I stated in my paper, I think is highly reprehensible from the

way it is done, perhaps more than anything else; and that is, the physician will take an applicator and put some cotton on it, and dip it in his escharotic, whatever it may be, and pass it through the cervical canal; and he gets no application of the escharotic to the uterine cavity itself, but the cervical canal gets it, and we have bad results therefrom. In a great number of cases it sets up a little bit of uterine colic, and if there are any discharges they are likely to pass into the tube and the trouble is increased rather than diminished, and, anyway, there are other local measures for treating conditions that have been treated by escharotics which leaves out the necessity altogether of using them. The gentleman who spoke last says he does not approve of the extirpation of the ovaries. While I do not know that any person approves of this operation in health, I have no doubt the gentleman himself, if he had a part which is analogous to the female ovary, and it was giving him as much trouble as the female ovaries sometimes give her, he would go and very quickly have it removed, notwithstanding the feeling against that operation in every-day life. In regard to the stimulating of the ovaries: For the cure of these troubles, I think you will find in nine cases out of ten, stimulation will increase the trouble instead of diminishing it. The great trouble we find in treating these cases is to keep the patient from performing marital duties, and therefore keep from the stimulating of the glands. Now, how the stimulation of an inflamed and unhealing organ can remedy that inflammation, or that diseased condition, is more than I can understand.

THE MANAGEMENT OF SOME CASES OF PELVIC SUPPURATION IN WOMEN.

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Following the teaching and example of Tait, the profession has for many years given its sanction to the principle that a large proportion of cases of pelvic suppuration in women arising in the tubes and ovaries should be treated by the removal of these organs.

The brilliancy, ease and comparative safety with which ablation of the uterine appendages is performed by expert hands has been a potent factor in its general adoption.

Enlarged experience with this operation for suppuration, has shown that a goodly number of those submitting to it, fail, for one reason and another to receive the complete and permanent relief expected from a radical measure, and sooner or later drift back, complaining of pelvic pains, annoying discharges and other symptoms that can not be reached by medication. In consequence, the principle has been extended and it is sought to solve the problem in cases where the disease is considerable by removal of the uterus also. It is argued that in these instances the uterus is so far affected that restoration to a comfortably normal condition is impossible; that it is the offending organ, and, being useless after the removal of the tubes and ovaries, it might better be extirpated at the same time, inasmuch as the operative risks are but slightly increased. Total extirpation of uterus and annexa has been for sometime a recognized procedure on the Continent, and during the past two years this operation by the abdominal route has been vigorously urged and adopted by some of the more energetic operators, better results and lower mortality being reported.*

The French school advocates the same general principle but have championed the vaginal route and claim most marvelous successes. Jacobs, of Brussels, reports, up to August, 1894, 122 total extirpations by the vaginal route for suppurative disease with but three deaths, a mortality of 2.54 per cent.†

So far as we are now informed, the results of extirpation are more satisfactory than salpingo-oophorectomy, in that operative sequelæ are less common, though it is yet perhaps too early to draw final conclusions.

It would appear that the limit of operative success and radicalism has, in some hands at least, been reached, but at the frightful cost of sex; and the question constantly recurs, is this absolutely necessary in so large a proportion of instances? Are there not other methods of handling some of these pus cases,

*Baldy in American Gynecological and Obstetrical Journal, October, 1894.
†American Journal of Obstetrics, November, 1894.

that while not subjecting the woman to unnecessary risk, may yet preserve to her the hope of possible maternity and the avoidance of a condition that is not infrequently an opprobrium?

In view of the fact that other organs and parts of the body recover more or less completely with restoration of function after rather extensive suppurative disease, it is being asked with increasing frequency if the pelvic conditions of women truly differ so widely from those which hold elsewhere in the economy that inflammatory states ending in suppuration must be met by the removal of important organs, without a determined effort being first made to save them by lesser measures on the lines of well recognized and established principles, evacuation and drainage.

The only other instance in which it is generally held that a part should be sacrificed for suppurative disease is the case of the appendix, and this is so deeply placed in the abdomen that pus is almost sure to take a dangerous direction. The cases, however, are not parallel in that with the loss of the appendix the individual is quite content and still fulfils all the duties of life. The contrary holds in the removal of the uterine appendages.

I do not conceive that a pyosalpinx or an abscess of the ovary in itself indicates a disorganized condition of the organ that precludes the possibility of the restoration of function, provided evacuation and drainage can be effectually secured, though in many cases it is undoubedly so. This view is supported by personal observation and not infrequent reports in the journals of the discharge of such purulent collections, subsequently followed by pregnancy and normal parturition. Such instances, though perhaps not common, stand as a contradiction to the view that these organs are henceforth useless, and that in prompt removal lies the woman's only hope of cure, if not of safety.

I would not be understood as detracting from the value and necessity of the radical measures above mentioned in chronic and aggravated cases, believing as I do that they offer the only hope of absolute and permanent relief. I urge, however, that if carefully studied, in a large number of a certain class of suppurative cases lesser means may be employed

without jeopardizing the patient either from sepsis or abdominal rupture.

It is absolutely essential to individualize our cases both as to etiology and the exact pathological condition present and just so far as we succeed shall we be enabled to treat our patients upon broad lines, selecting without prejudice the most conservative and appropriate procedure, to the exclusion of none, even the most radical.

Collections of pus in the pelvis may be high or low, they occur in the walls of the uterus, in the tubes and ovaries, in the peritoneum walled off by adhesions, or they develop in the connective tissue. They may be single, small or large, double, occupying both sides of the pelvis, or multiple, small and sacculated.

Within the time limit allowed it is not possible to discuss the different procedures appropriate to all these varying states and to lay down the rules for our guidance in their selection and without attempting to cover the subject, suffice it to say that they must be adapted and modified in each individual case according to the general and exact local conditions found upon critical examination.

It is my desire for a moment to direct attention to a particular class of cases of pelvic suppuration in women, which may properly be treated by the most direct and simple measures, and I submit that there are a considerable number in which, though a radical operation may be performed without grave risks to life, if the abscess can be reached through the vagina, the simple and old practice of evacuation, free, complete and thorough drainage, with every precaution of surgical cleanliness, will prove efficient and eminently satisfactory in more than a sufficient proportion of cases to warrant the effort to cure, without the removal of organs.

The special cases to which such treatment is applicable are those acute abscesses forming low in the pelvis, resulting from infection following labor or abortion, and arising in the connective tissue or tubes, more rarely in the peritoneum. In such instances the abscess is frequently a single collection of pus and most favorable for vaginal puncture.

Again, there are cases of a more chronic character, in which the pus is confined to one sac, and cœliotomy would be advisable but for a degree of sepsis and prostration that would make the incident shock dangerous. In these the temporary expedient of evacuation may be applied.

It may, however, be stated as a general rule that the more chronic the inflammation, the greater the probability that the condition is not one remediable by such simple measures, that the pus is distributed among several pockets, separated by old adhesive peritonitis, and can not be completely evacuated. or that the pelvic organs have become so infiltrated and disorganized by the chronic septic condition that the removal of the pus alone would serve very little useful purpose, and the tissue itself must be taken away to effect even temporary benefit.

It is recommended that those cases of abscess not easily accessible by the vagina, and those in which it is suspected conditions exist that would make such approach hazardous should be attacked from above, and after an inspection through an exploratory abdominal incision, vaginal puncture be practiced, aided very possibly by a hand in the abdominal cavity, and especially when the adhesions present are too firm to warrant enucleation.*

By vaginal puncture we imitate most nearly Nature's method of ridding herself of accumulations of pus, and by attacking early we give it a safe exit, preventing extension, and perhaps, discharge in dangerous directions, trusting the recuperative powers to repair the damage already done. Almost all these acute cases will show at once a marked improvement, and later, very probably, a practical cure, the local scar and contractions being lessened in time. Those in whom relief does not occur may later come to the operating table at a time of election in improved condition, and better able to withstand the effects of the shock. The operation in such cases will undoubtedly prove more difficult because of the firmer adhesions, cicatricial tissue and possible fistulæ, but even such additional difficulties and risks in the few, it would appear, are overbal-

*Cleveland, New York Gynecological Journal, June, 1894.

anced by the substantial and permanent relief obtained in many, while the chance of preserving important organs and cure without radical operation is given.

To illustrate, I take two cases from my notebook:

CASE I.—A married woman of 22 years of age, no children, two miscarriages, the last some three years before, gave an obscure history of gonorrhea. Six months after the last miscarriage she had an attack of peritonitis lasting three weeks, followed by decided pelvic distress and pain. Six months prior to my first visit she had a second attack of peritonitis, followed by increased pelvic pains and semi-invalidism.

When I saw the patient in consultation she had been ill in bed ten days. Commencing with malaise, rigor, slight fever, she finally had a severe chill with temperature of 106°, five days previous; followed by a temperature varying from 99½° in the morning to 103° in the evening. There had been no marked pain though tenderness of the lower abdomen that had been complained of. Examination showed a large tumor occupying the left iliac region, rising quite half way to the umbilicus, though not bulging the abdominal walls forward to any extent and reaching down into the left pelvis nearly to the level of the internal cervix, pushing the uterus to the right. Indistinct fluctuations could be felt between the vaginal finger and hand on the abdomen. No peritonitis and little tenderness. Abscess diagnosticated and vaginal puncture advised. The patient was etherised and placed upon the table and very carefully examined by further counsel, Dr. Parkhill. The diagnosis and treatment advised were concurred in. Through a speculum the vaginal vault was exposed and a thin narrow knife thrust deeply into the pelvis immediately to the left of the cervix. A few drops of pus escaped. A sharp pointed pair of scissors was passed through the opening into the pus cavity and withdrawn after the blades had been separated making a large, free, lacerated opening. About a pint and a half of odorous pus escaped. The pus cavity was carefully douched, a large drainage tube introduced and the vagina loosely packed with iodoform gauze. The patient made a perfectly smooth, rapid recovery, was out and about in a couple of weeks, and in three weeks the wound

had perfectly cicatrized, leaving a very slight thickening on the left side which has finally disappeared, and now the only evidence of trouble is the scar and slight contraction at this point. There is no pain or pelvic discomfort. Her general health is perfect.

CASE II.—Married woman, 29 years of age, two children, one miscarriage, at the third month, about six weeks before I saw her in consultation. Prior to miscarriage she had had no pelvic trouble. At the time of miscarriage pieces of membranes had been retained, subsequently necessitating removal by the curette. Though she soon recovered sufficiently to go about, pelvic pain and malaise persisted and finally ten days before I saw her she had been seized with rigor followed by fever, and sharp pain in the lower abdomen, more particularly on the right side. At my first visit pulse was 132, temperature 102°, expression anxious, abdomen swollen, tympanitic and exceedingly tender, especially the lower part. Careful manipulation discovered a rounded mass, the size of an orange rising above the right Poupart's ligament. Pelvic examination showed uterus enlarged, tender, fixed and pushed to the left, the right pelvis being occupied by a rounded mass outlined by a rather firm pressure in the right vaginal vault. Diagnosis, pelvic abscess with pelvic peritonitis. Vaginal puncture advised. The procedure was similar to that in the preceding case. Relief was prompt. All symptoms steadily though slowly subsiding, she made an uninterrupted recovery, the opening ceasing to discharge in about a month. Four months later her general health was excellent, she had gained flesh and was stouter than ever before. Examination found the uterus slightly enlarged, fixed by adhesions and somewhat tender on firm pressure. The right side of the pelvis shows no mass. The broad ligament is contracted and tense. There is a small tender mass posterior to the uterus and the left tube is enlarged, though not sensitive.

In the first patient we have a complete and satisfactory relief of all morbid conditions. In the second the original mischief was much more extensive, and the whole pelvis involved in the acute inflammation, but yet simple evacuation and drainage resulted in prompt relief of all symptoms, and though some

day the pelvic conditions may become aggravated, and a radical operation be called for, she is now in excellent health so far as she can tell, with a very good prospect of practically overcoming the pathological conditions of the pelvis.

Vaginal puncture and drainage is scarcely considered as an operation by the patient and friends there is no question as to the removal of organs and little or no objection is raised to the evacuation of the pus, which is recognized as necessary. This procedure attacks the collection of pus by the shortest and most direct route, with natural drainage downward; the abdominal cavity not being opened, there is a minimum of shock, little danger, and, as the operator invades only diseased structure, there is no risk of incurring the liability of greater infection than already exists. The convalescence is shorter and more assured, while finally, external wound and scar, with possibility of future hernia is avoided. The risk of injury to the ureter and uterine artery is slight. In exceptional cases, loops of intestine are imprisoned low in the pelvis in the mass of exudate, and in such instances this condition would be an element of danger, but fortunately the accident of puncturing them has seldom occurred, and to meet this possibility exploratory cœliotomy has been advised.

In what has been said there is nothing that is new. I wish merely to call to mind this well-known, simple and straightforward procedure, and urge that by study and selection very many cases of pelvic suppuration in women may be completely relieved without a grave and mutilating operation, and though the organs may be left in a damaged condition, they do not necessarily give rise subsequently to any distressing or dangerous subjective symptoms.

DISCUSSION.

DR. STODDARD: In regard to the admirable paper just read I want to say this: that the method or treatment is doubtless good. It is good surgical treatment always to evacuate pus wherever it is found. It is a prime principle with all medical men as well as surgeons, to remove the cause as well as the effect. In the large majority of cases of pelvic abscess or pelvic

suppuration, wherever we have pus in the pelvis, the cause is either in the tube or the uterus itself. The doctor has told us nothing at all about removal of the cause. Suppose you have a pelvic abscess, and wish to evacuate the pus. In the first instance the starting-point has been in an inflamed, pus-filled tube. I think that the evacuation of the pus is going to do the patient good for the time being, but eventually the thing is opened over and over again, until the patient is worn out.

DR. I. B. PERKINS: I agree with Dr. Jayne in this matter, that the evacuation of an abscess of this kind through the vagina is preferable, and, in fact, much better than through the abdominal wall, if it can be safely done. I also agree with Dr. Stoddard, that if the abscess is from inflammation in the Fallopian tube, which is likely to be the case., the probabilities are that there will be a recurrence of the abscess, and sooner or later the same operation will be needed again. In the cases that I have had an opportunity of watching for some time, say three or four years continuously, the abscesses have almost invariably returned, and I deem it better, if a clear diagnosis can be made, to evacuate the pus through vaginal puncture if possible, and then, in the sub-acute or chronic stage, do the operation for removal of the offending member. I believe this to be the safer plan. I have in mind one case that I operated on last year, in which I made an exploratory incision for the purpose of determining the extent of the abscess, and also with the purpose of determining whether or not I could safely open through the vagina. On opening the vagina I found that I could freely pass my finger between the distended abscess and the vagina, and had I attempted to puncture through the vagina, I would have emptied the abscess into the abdominal cavity. Of course, I would have gotten some of it through the opening into the vagina, but in all probability would have infected the cavity. However, the cavity was infected by the removal through the abdomen, because the sac of the abscess broke, and poured the pus into the abdominal cavity, but by taking it out with sponges, and washing as best I could, the case got along slowly, but made a good recovery, and has ever since been in good condition. I have since that, in all these cases, concluded that I

would begin by dissecting through the vaginal wall, and as soon as I had gotten through, if I got into the abscess, all right; if not, I would then stitch the vaginal wall to the peritoneum, covering the abscess before opening it. I have had no opportunity of emptying them this way, but have had several cases in which on dissecting through the vaginal wall, the first thing that I encountered was the pus in the abscess.

HYSTERECTOMY.

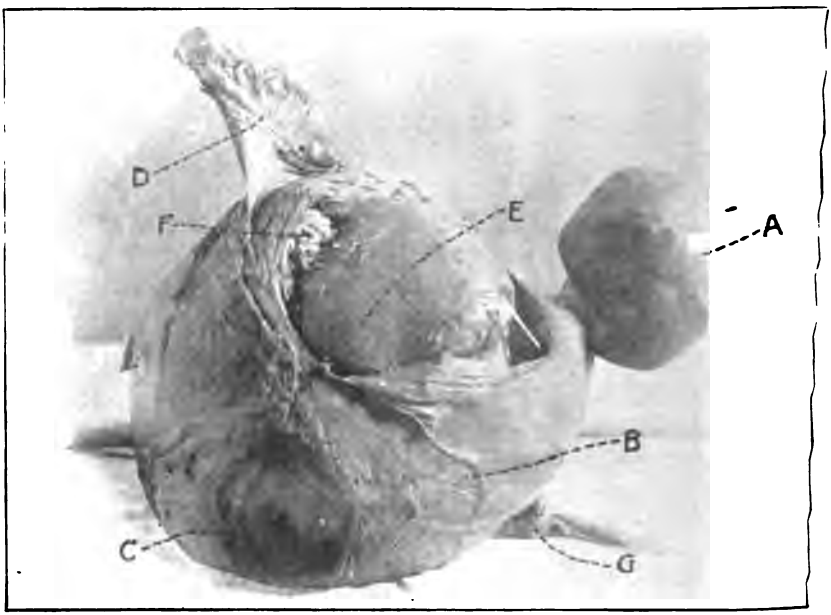
I. B. PERKINS, M. D., DENVER, COLO.

It is not my purpose in this paper to discuss the operation of hysterectomy, nor the circumstances requiring the operation. I wish simply to report two cases of supra-vaginal and one of vaginal operation which I have performed within the past year.

CASE I.—*Uterine Fibroma.* Mrs. E., aged 35, American born, married, was never pregnant, dressmaker; gives history of having menstruated first when fourteen years of age, and of having had good health and a normal function up to about eight years ago, when she began to have dysmenorrhœa and a prolonged menstrual flow. I saw her first during the winter of 1889 and 1890, and on examination discovered a tumor about the size of a teacup apparently occupying the right side of the pelvis, and extending about two or three inches above the pubic arch, and lying to the right of the median line. I could not decide at that examinaton, which was made without an anæsthetic, what the character of the tumor was, but thought it fibroid, and advised exploratory operation, which was declined. I saw the patient no more until January of 1895, five years having elapsed since my other examination; when she consulted me, saying she was ready to have the tumor removed. The tumor now appeared to be as large as a pregnant uterus at full term. The patient was not in good condition, being anæmic and very nervous, giving a history of sleepless nights, poor appetite and an irritable disposition, also that hæmorrhage at the menstrual epoch was very profuse, and lasted from ten to twelve days. Obstinate constipation was present. I put her on a

tonic treatment and rich diet preparatory to the operation. On the nineteenth of February, 1895, she was admitted to St. Luke's Hospital, and on the following day I operated. For five days prior to the operation she was kept on liquid diet, and a saline cathartic given each morning. When admitted to the hospital she was given another cathartic, and at night an enema of warm water and a thorough bath were given, after which the pubes and external genitalia were shaved. The further preparation consisted in thoroughly cleansing the abdomen, vulva, perineum and vagina with sterilized soap and water, and then bathing with a solution of bi-chloride of mercury, 1 to 1,000. A packing made of sterilized gauze, and wet in a solution of bi-chloride, 1 to 2,000, was put over the entire abdomen and vulva. This dressing was left on, and was removed in the operating room. All instruments used in the operation were boiled for half an hour; also all ligatures to be used were sterilized. The operator and assistants observed the usual precautions followed in these cases of scrubbing, bathing, etc. The anæsthetic used in this case was chloroform; there being a trace of albumin present in the urine, it was deemed best not to use ether. I was assisted in the operation by Drs. J. M. Perkins, Charles Jaeger and Alfred Seebass. The vagina, vulva and perineum were now thoroughly cleansed by an assistant with sterilized soap andwater, followed by a solution of bi-chloride, 1 to 1,000. I now dilated the os, and introduced a probe, which went up into the uterine cavity its full length, about thirteen inches. This caused a profuse hæmorrhage, and without curetting the uterine cavity (the method I prefer), I contented myself with thoroughly douching out the uterus with bi-chloride, 1 to 2,000, and putting a piece of iodoform gauze in the cervix, crowding it up several inches. The vagina was now packed with iodoform gauze. The patient was then placed in the Trendelenburg position, the dressing taken from the abdomen, and the abdomen scrubbed with sterilized soap and water, then with a bi-chloride solution of 1 to 1,000. The patient was now covered with sterilized sheets, and the abdomen was covered with sterilized towels except in the median line. The first incision was from two inches above the pubic arch nearly to the umbilicus, and

putting in my hand, I explored, finding a tumor, smooth except some small nodules, and on the right side, resting against the kidney, a tumor something the shape and about twice the size of a normal kidney, and attached to the main tumor. (Photograph 1.) I now enlarged the incision to within about two inches of the ensiform cartilage, in all about fourteen inches in



MRS. E.—CASE I. POSTERIOR VIEW.

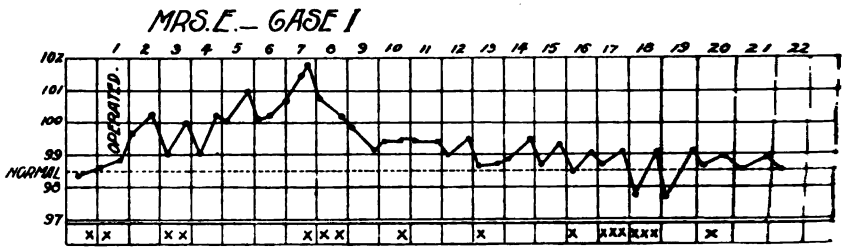
A—Subserous tumor, that was resting over right kidney.
B—Shows where posterior flap was taken.
C—Shows os uteri.
D—Ovary and tube, flattened by pressure.
E—Sub-mucous fibroid.
F—Gauze, put between wall of uterus and tumor.
G—Ovary and tube.

length, turned the tumor out, and covered the intestines with sterilized towels, and packed sterilized towels in the upper part of the wound, instead of temporarily closing the upper part of the incision as is done by some operators. I began outside the ovary and tube, transfixing part of the broad ligament with the

ligature, then put another ligature nearer the tube and ovary, and cut between them with blunt scissors, taking care not to cut quite as much tissue as was included in the ligatures, then placing other ligatures in the same manner, except that I did not in every instance place two ligatures, depending on the hemastatic forceps for controlling the hæmorrhage on the side next to the tumor. I continued to the base of the broad ligament, trying the uterine artery when I came to it. I proceeded in like manner on the left side. Then, with a light stroke of the bistoury, I cut through the peritoneum, making a semicircular flap posteriorly. (B, photograph 1.) I then dissected this flap down to the cervico-vaginal juncture, then, with a sound in the bladder as a guide, manipulated by an assistant, I took my anterior flap, going about one to two inches above where the bladder joins the uterus, and dissected this down also. The next step was to sever the uterus from the vagina at its juncture, going into the posterior cul-de-sac first, an assistant's finger in the vagina as a guide. The uterus being separated completely, was removed, and the top of the vagina at once closed with sterilized catgut, care being taken to bring denuded surfaces together. The cavity or cup formed by the flaps of peritoneum was then sponged out until quite dry, the peritoneal flaps united by continuous lock-stitch suture of medium-sized catgut. The abdomen was then washed out with normal salt solution, sponged with sterilized sponges, and the abdominal incision closed with interrupted sutures of silkworm-gut about one-half inch apart, transfixing with the same suture the peritoneum, muscles and skin; dressed with iodoform, iodoform gauze, sterilized gauze and cotton, and held in place by adhesive strips and a bandage; also put same kind of dressing over the vulva, held by a T-bandage.

During the operation, several hypodermic injections of strychnine, 1-25 of a grain, were given, and this was kept up at intervals of two hours for several days; also an occasional hypodermic of nitro-glycerine, 100th of a grain was given. Nutritive enemeta: First whisky and black coffee, afterwards whisky and peptonized beef juice were kept up for several days. Nothing else in the way of nutrition was given until the

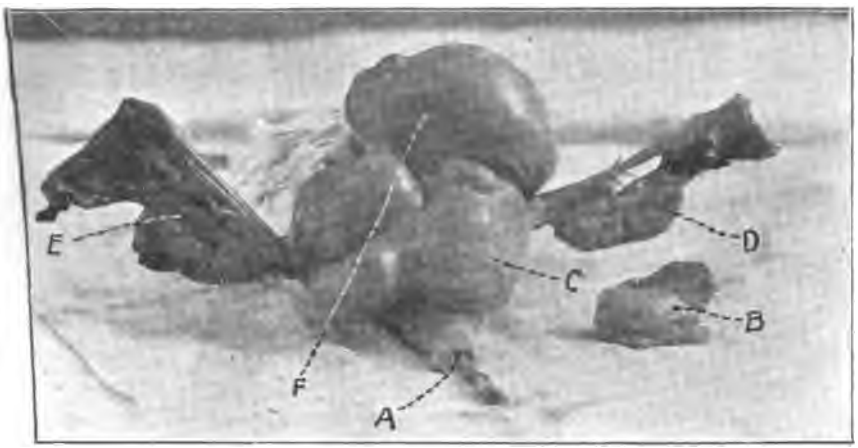
bowels moved freely, which was on the third day. The quantity of urine passed the first twenty-four hours was twenty-seven ounces. This, with absence of other symptoms, caused me to feel that no injury had been done the ureters. The tem-



perature chart used in the case, which I have here, will show you that the highest temperature reached was on the seventh day. This was due to the bowels not having moved for several days. As you will see, it came down when they had moved. The check marks at the bottom of the chart show movements of the bowels. The patient left the hospital at the end of the third week. Was sitting up and walking a little at the end of five weeks, and at this writing, four months after operation, appears to be in perfect health. The tumor which I will now exhibit weighed fifteen pounds after removal, and was pronounced a fibroma by Dr. Seebass, who kindly examined it for me.

CASE II.—*Uterine Fibroma.* Mrs. D., aged 40, German. married, never pregnant. Menstruated first at 16. Gives history of fainting spells at first three or four menstrual periods. Always flows freely, flow lasts sometimes for seven days. Noticed no marked change in health until about a year ago, when she began to fail. Constipation was obstinate, and she had a peculiar affection of speech, by which she would stammer and stop in conversation. I examined her first in February, 1895, but had frequently advised examination during the past eight years. Found on examination a tumor, reaching above the pubes, firm, and nodular in shape. Nodules could be felt through the vagina, rectum and abdomen Advised exploratory operation. She was admitted to St. Luke's Hospital, April 5, and operated

upon April 6, 1895. Assistants, Drs. A. A. Clough and J. M. Perkins. All preparations the same as in Case No. 1. Made a small incision in median line just above the pubes, and explored, finding a firm nodular tumor, very irregular in shape, which

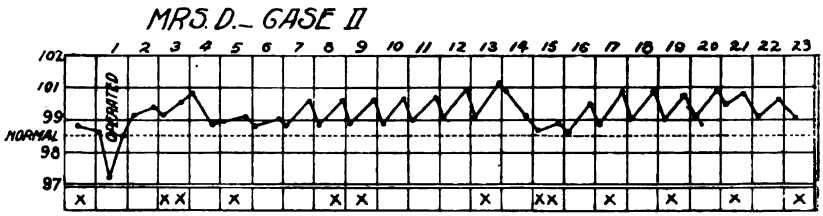


MRS. D—CASE II. POSTERIOR VIEW.

A—Os, with gauze in it.
B—Nodule, dissected off with flap.
C—Place from which nodule was taken.
D—Ovary, tube, and part of broad ligament.
E—Ovary, tube, and part of broad ligament.
F—Nodules surrounding uterus.

could only be removed by complete extirpation. I enlarged the opening almost to the umbilicus, and removed uterus and ovaries, much as described in case No. 1, except that the peritoneum in this case was found very friable, tearing in several places, and bleeding freely as I ligated down through the broad ligaments. When I attempted to take my flaps, I found it impossible to get one on account of the peritoneum tearing so easily; so on the posterior surface I dissected off a nodule of the tumor with the flap, thinking I could dissect it out afterward. But when I got below the nodule, the peritoneum again broke through, and I was compelled to take some cervical tissue, and make this, with the top of the vagina, serve for the posterior flap. My anterior flap I began from near the bladder, taking

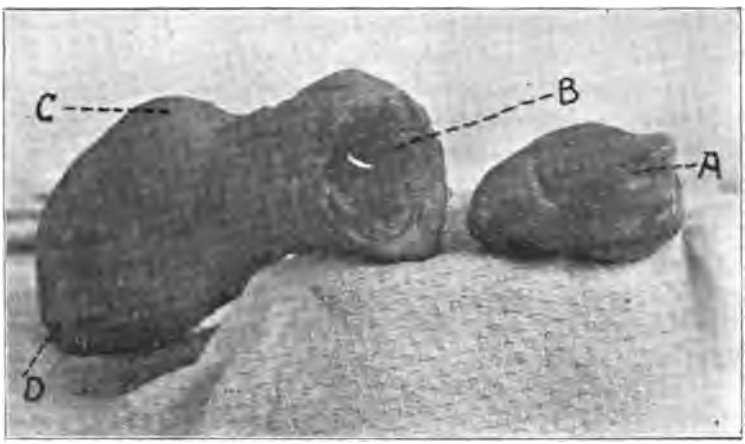
only peritoneum enough for my continuous suture; this, with the other flap, covered over the vaginal opening. The operation was completed as in the other case, and the after-treatment was practically the same. I show you the temperature chart and a



posterior view of the tumor; also the tumor itself. The sudden rise of temperature noticed on the chart was due to disturbance of the stomach. Patient is well and able to walk. At the present time her speech is good. The faltering noticed before operation being scarcely noticeable since the first week after the operation.

CASE III.—*Diffuse infiltrating carcinoma of the cervic.* This case is one of vaginal hysterectomy. Mrs. L. age 53, English, mother of ten children; consulted me first nearly eight years ago for profuse hæmorrhage lasting sometimes for two weeks, coming on usually at regular monthly intervals. On examination I found a fibrous polypus attached to the left side of the uterus just within the internal os by a pedicle. I removed it January 21, 1888, with complete cessation of hæmorrhage. The patient was well until about six months ago when she began to flow irregularly, not very profuse at first, but it grew worse until about two months ago, when I was consulted. On examination I found the uterus somewhat above the normal size and quite sensitive. The appearance of the cervix led me to suspect malignant disease, and I took a specimen for examination. Dr. Axtell made the examination for me and pronounced it diffuse infiltrating carcinoma. Patient was admitted to St. Luke's hospital on the 8th of May, 1895, and operated on the following day. Assistants, Drs. A. A. Clough, Carl Johnson and J. M. Perkins. Preparation of the patient was the same as in the

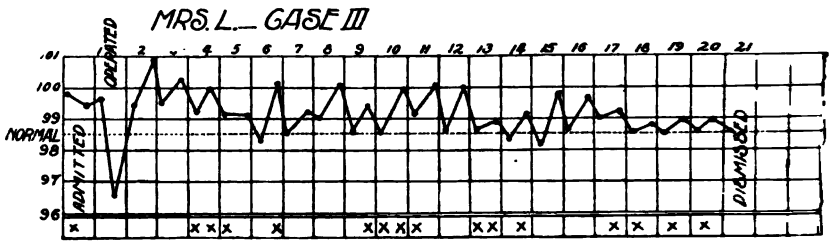
other two cases. In the operating room the vagina was thoroughly cleansed with sterilized soap and water and a solution of bi-chloride—1 to 1,000. With a sharp curette I removed all the diseased tissue I could, finding that it extended highest on the right side. After again douching out the vagina and the cavity which I had made in the cervix, I packed the cervix full of iodoform gauze and closed it with a continuous silk suture, and again douched out the vaginia with bi-chloride



MRS. L.—CASE III. POSTERIOR AND LEFT LATERAL VIEW.
A—Tumor taken seven years ago.
B—Site of carcinoma.
C—Nodule on posterior part of uterus.
D—Fundus of uterus.

1 to 1,000. After this a continuous douche of normal salt solution was used during the operation. I freed the cervix from the vagina by a free incision anteriorly and posteriorly entering the posterior cul-de-sac first; stitched the peritoneum to the mucous membrane by a continuous suture of sterilized catgut, and then tied off the broad ligaments with catgut very much as when done from above. The most difficult part of the operation was in freeing the bladder from the uterus, as it was spread out and adherent over a larger space than is usual. The stumps of the broad ligaments were brought down and stitched into

the vaginal opening above, thereby closing the peritoneal cavity. In doing this the left ovary and tube came down in the way and were removed. The vagina was packed with iodoform gauze and a dressing of iodoform gauze, iodoform and sterilized gauze and cotton were put over the vulva and held by the T bandage. I removed the vaginal tampon on the fourth day, and used a bi-chloride wash, 1 to 4,000. The case ran an even



course and made a good record, leaving the hospital on the twentieth day. I exhibit this specimen, also specimen taken in the first operation seven years ago, and a photograph showing both. The view of the uterus is posterior and shows just above the cervix a small, movable nodule.

REMOVAL OF POWDER-MARKS BY PEROXIDE OF HYDROGEN.

LOUI WEISS, M. D., DEL NORTE, COLO.

Several months ago I treated this case (exhibiting photograph) by peroxide of hydrogen. This little fellow was playing with a can of black gun-powder, containing about half a pound, pouring it on to a fire, when it exploded, fragments of the can cutting his hands and fingers very severely, burning his face and filling it with powder, as this photograph will show. I took a hypodermic syringe with a very fine-pointed needle, filled with peroxide of hydrogen, and picked out as much of the powder as I could with it, pressing on the piston so as to deposit a very small quantity of the peroxide into the cavity occupied by the grain or grains of powder, or where I only found a stain left by the powder I deposited the peroxide just the same

as I did where powder was still present. In places where the powder lacerated the tissues, or where the blood prevented my seeing after the hypodermic needle entered the parts in proximity to it, I deposited a very small quantity of the peroxide. This method of treatment I kept up for about ten days, dressing the wounds with a solution of the peroxide on absorbent lint. I found that this method of treatment promised to be very satisfactory, so on the fourth day after the accident I had this photograph taken with a view of comparison, but find there is nothing to compare, the little fellow's face shows very few faint powder stains but has the appearance of having gone through a very mild case of varoloid. Whether this result was due to a chemical or mechanical effect, I am not prepared to say, but think it was both. I found that when the peroxide came in contact with the powder and the serum or pus surrounding it, oxidation and effervescence took place and there was a tendency of their coming to the surface during effervescence.

I had thought that this method might be used in obliterating tattoo marks, but have not as yet had an opportunity of applying it. The Fourth of July coming on, probably some of you gentlemen will have some cases of powder burn to treat. Should such be the case, I would like to hear the result of the further use of the peroxide.

LIST OF MEMBERS.

Date		
1888	Adams, B. F. D.	Colorado Springs
1894	Ambrook. Mary L.	Boulder
1873	Anderson, B. P.	Colorado Springs
1886	Arbogast, B. A.	Breckenridge
1887	Auerbach, L.	Denver
1892	Axtell, E. R.	Denver
1892	Ashbaugh, A.	Central City
1894	Bagot. W. S.	Denver
1890	Baker, M.	Denver
1892	Bane, W. C.	Denver
1892	Bates, Mary E.	Denver
1892	Bates, Mary H. Barker	Denver
1895	Beatty, J. T.	Highlands
1895	Bedell, W.	Lamar
1895	Beebee, J. E.	Denver
1892	Bellrose, Norman W.	Eaton
1878	Beshoar, M.	Trinidad
1894	Black, J. A.	Pueblo
1892	Black, G. Melville	Denver
1895	Blaine, J. M.	Denver
1879	Blickensderfer, J. C.	Denver
1888	Boice, Jno.	Denver
1884	Bonesteel, S. A.	Denver
1888	Bonnet, W. M.	Denver
1892	Bonney, S. G.	Denver
1885	Bosanko, S. Arthur	Leadville
1894	Boyd, E. T.	Leadville
1895	Brasher, Lewis B.	Denver
1895	Brown, Elizabeth E.	Denver
1895	Bruner, Wm. L.	Meeker
1895	Buchtel, W. H.	Denver
1883	Bucknum, A. M.	Denver

1889	Bucknum, H. H.	Denver
1894	Bulette, W. W.	Pueblo
1894	Bull, H. R.	Grand Junction
1894	Burns, T. M.	Denver
1895	Calhoun, A. W.	Denver
1892	Campbell, W. A.	Colorado Springs
1883	Carlin, P. V.	Denver
1895	Carlin, T. J.	Denver
1895	Carrier, F. N.	Canon City
1892	Case, A. G.	Denver
1889	Catanach, A. J.	Denver
1895	Cheney, Alex. M.	Denver
1894	Chipman, J. C.	Sterling
1883	Clark, J. K.	Denver
1889	Clark, J. L.	Denver
1884	Cleary, Geo.	Denver
1889	Clough, A. A.	Denver
1894	Cochems, F. N.	Salida
1893	Coleman, A. W.	Denver
1895	Collier, F. M.	Denver
1894	Conroy, C. P.	Denver
1890	Coover, D. H.	Denver
1882	Corwin, R. W.	Pueblo
1883	Craig, W. B.	Denver
1878	Craven, T. H.	Canon City
1892	Crouch, H. C.	Denver
1888	Croker, F. B.	Littleton
1895	Cummings, W. M.	Las Animas
1892	Davidson, Jno.	Central City
1894	Davis, W. B.	Pueblo
1892	Davis, W. C.	Denver
1895	Davis, W. H.	Denver
1894	Davison, Jno. T.	Denver
1880	D'Avignon, F. F.	Leadville
1878	Dawson, J. W.	Canon City
1894	Dean, M. H.	Glenwood Springs
1892	Debeque, W. A. E.	Debeque
1874	Denison, Chas.	Denver

1895	Delehanty, Edw	Denver
1895	Disney, F. A. E	Denver
1887	Dorland, W. L	Pueblo
1882	Duggins, G. G	Pueblo
1894	Durbin, L. T	Denver
1871	Edmundson, W	Denver
1891	Elliott, Jno. F	Idaho Springs
1895	Ellis, Lyman M	Denver
1871	Elsner, Jno	Denver
1885	Eskridge, J. T	Denver
1892	Estes, N. D	Alamosa
1890	Exline, J. W	Denver
1895	Fearing, Sarah J	Denver
1894	Ferguson, C. J	Denver
1895	Fierstone, J. L	Fort Morgan
1888	Finney, Frank	La Junta
1894	Fish, E. H	Denver
1882	Fisk, S. A	Denver
1891	Fleming, C. K	Denver
1885	Forhan, T. J	Rouse
1891	Foster, Jno. M	Denver
1894	Freeman, W. L	Denver
1895	Freeman, Leonard	Denver
1885	Galloway, B. S	Leadville
1888	Gardiner, C. F	Colorado Springs
1894	Gilbert, Bartlett	Denver
1893	Gildea, P. F	Colorado Springs
1895	Gilmore, R. T	Denver
1879	Graham, J. W	Denver
1885	Graham, R. F	Greeley
1890	Grant, W. W	Denver
1893	Green, Frank D	Pueblo
1880	Greene, J. L	Minturn
1884	Hall, J. N	Denver
1888	Harrison, M	Aspen
1889	Hart, James A	Colorado Springs
1894	Harvey, H. G	Denver
1892	Haskins, B. F	La Junta

1885	Hassenplug, G. K	Denver
1879	Hawes, Jesse	Greeley
1880	Hawkins, T. H	Denver
1892	Hawk, J. W	Denver
1888	Hay, Rilla G	Pueblo
1895	Heath, Lillian	Rawlins, Wyo
1891	Herrick, J. C	Denver
1893	Hershey, E. P	Denver
1894	Hickey, C. G	Denver
1893	Higgins, J. W	Denver
1895	Hill, E. C	Denver
1894	Hobhouse, Edmund	Glenwood Springs
1892	Holmes, A. M	Denver
1894	Hopkins, S. D	Denver
1875	Horn, T. G	Colorado Springs
1894	Howard, E	Denver
1884	Howland, H. H	Denver
1894	Huffman, O. C	Denver
1886	Hughes, T. A	Denver
1892	Hunt, Wilbur N	Cheyenne, Wyo
1894	Hunter, Chas	Colorado Springs
1892	Hutchinson, J. Cooper	Florissant
1895	Jackson, Edward	Denver
1895	Jaeger, Chas	Denver
1884	Jayne, W. A	Denver
1895	Jefferson, B. L	Littleton
1895	Jeffery, Alicia F	Denver
1891	Jenner, C. W	Denver
1894	Johnson, Abijah	Montrose
1894	Johnson, Carl	Denver
1895	Johnson, J. E	Denver
1892	Kahn, Lee	Leadville
1891	Kahn, Sol. J	Leadville
1884	Kelley, J. P	Golden
1893	Keith, John G	Leadville
1890	King, A. T	Pueblo
1892	Kleiner, M	Denver
1891	Law, G	Greeley

1895	Lake, E. F	Denver
1889	Leavitt, B. C	Denver
1882	Lee, E. A	Fort Collins
1874	Lemen, H. A	Denver
1873	Lemen, L. E	Denver
1892	Le Mond, R. F	Denver
1887	Levy, Robert	Denver
1891	Liebhardt, Laura L	Denver
1895	Liggett, Wilbur T	Cripple Creek
1890	Lobingier, A. Stewart	Denver
1893	Lowrey, Mary T	Boulder
1895	Ludlow, D. H	Denver
1888	Lyman, C. B	Denver
1894	Mack, M. H	Denver
1895	Mager, Hugo	Denver
1895	Maghee, Thomas G	Rawlins, Wyo
1892	Manly, Charles	Denver
1892	Marbourg, E. M	Pueblo
1894	Marey, F. H	Elbert
1892	Marquette, Madeline	Denver
1894	Marks, A. D	Fort Lupton
1895	Mays, A. G	Victor
1894	Maxwell, W. J	Castle Rock
1895	Meuer, S. H	Denver
1893	Melvin, J. Tracy	Saguache
1892	Mentzer, O. F	Denver
1892	Miel, Geo. W	Denver
1895	Miller, S. W	Denver
1895	Milligan, Josephine	Denver
1895	Moore, Will	Central City
1892	Morgan, Anna E	Denver
1894	Moulton, G. H	Glenwood Springs
1891	Munn, W. P	Denver
1894	MacLean, Luke	Leadville
1895	McArthur, A. D	Littleton
1871	McClelland, W. F	Denver
1895	McDaniel, J. W	Denver
1894	McDermith, S. T	Denver

1894	McDonald, A. J	Leadville
1894	McDonald, W. J	Hugo
1892	McHugh, P. J	Fort Collins
1895	McKinzie, George	Victor
1884	McLauthlin, H. W	Denver
1891	McNaught, F. H	Denver
1894	Nelson, C. D	Denver
1895	Neuman, Daniel	Denver
1894	Nickerson, W. M	Denver
1882	O'Connor, J. W	Denver
1890	Packard, Geo. B	Denver
1885	Parkhill, Clayton	Denver
1895	Peavey, Josephine L	Denver
1895	Pennock, V. R	Silver Plume
1887	Perkins, I. B	Denver
1894	Perkins, J. M	Denver
1892	Perry, B. J	Aspen
1890	Pershing, H. T	Denver
1885	Pfeiffer, O. J	Denver
1882	Phillips, G. W	La Junta
1895	Powers, Chas. A	Denver
1893	Powers, J. J	Denver
1894	Prentiss, J. L	Canon City
1892	Pring, E. J	Watrous, N. M
1895	Purcell, J. W	Denver
1877	Reed, Jacob	Colorado Springs
1894	Rice, C. O	Pueblo
1882	Rivers, E. C	Denver
1887	Robinson, A. J	Aspen
1889	Robinson, J. R	Colorado Springs
1883	Rogers, E. J. A	Denver
1884	Rothwell, E. J	Denver
1884	Rothwell, P. D	Denver
1889	Rothwell, Wm. J	Denver
1892	Rose, Edward P	Aspen
1892	Ruedi, C	Denver
1892	Robinson, G. W	Trinidad
1895	Sawins, A. H	Denver

1893	Seebass, Alfred R	Denver
1891	Sewall, Henry	Denver
1895	Shippey, O. P	Denver
1887	Shollenberger, C. F	Denver
1895	Shotwell, W. E	Denver
1895	Sigman, H. G	Pueblo
1893	Sirois, E	Denver
1881	Simmons, O. H	Council Bluffs, Iowa
1875	Solly, S. E	Colorado Springs
1895	Spratlin, P. E	Denver
1871	Stedman, A	Denver
1895	Stiver, Thomas J	Denver
1895	Stockett, B. F	Denver
1893	Stoddard, T. A	Pueblo
1894	Stover, George H	Eaton
1879	Strickler, W. M	Colorado Springs
1892	Stuver, E	Rawlins, Wyo
1892	Sheets, Elmer A	Denver
1892	Snitcher, H. C	Denver
1894	Taylor, Hannah L	Colorado Springs
1891	Taylor, Hugh L	Denver
1895	Taylor, Ralph	Denver
1889	Taylor, T. E	Denver
1890	Thayer, C. E	Cripple Creek
1878	Thombs, P. R	Pueblo
1894	Thompson, David	Denver
1892	Tucker, Beverly	Colorado Springs
1891	Vroom, J. N	Denver
1892	Van Meter, S. D	Denver
1892	Walker, L. M	Denver
1893	Walker, Maurice A	Denver
1895	Warren, F. E	Denver
1893	Waxham, F. E	Denver
1894	Wheeler, E. A	Denver
1873	Whitehead, W. R	Denver
1895	Whiting, J. A	Cripple Creek
1888	Whitney, H. B	Denver
1894	Willard, J. J	Pueblo

1895	Williams, Annie W	Denver
1894	Williams, Josepha	Denver
1895	Williams, T. J	Leadville
1874	Wilson, W. E	Denver
1894	Wooding, B. F	Denver
1894	Woods, E. L	Pueblo
1889	Work, Hubert	Pueblo
1887	Worthington, A. K	Denver
1895	Wright, Charles	Denver
1893	Yoakum, F. E	Denver

HONORARY MEMBERS.

1880	*O. D. Cass, M. D	
1873	Hon. John Evans, M. D	Denver
1889	Thos. F. Rambold, M. D	St. Louis, Mo.
1879	D. H. Dougan, M. D	Leadville
1895	Prof. John Ridlon	Chicago, Ill.
1895	Prof. Frank Norbury	St. Louis, Mo.
1895	Prof. Victor C. Vaughan	Ann Arbor, Mich.

*Deceased.

Total Membership 282

DECEASED MEMBERS.

NAME.	Year Elected	Age.	Residence at Death.	Date of Death.	MEDICAL COLLEGE.	Year Grad.
Lionberger, D. B...	1872		Denver.....	1873		
Davis, S. B.....	1873		Central City..	1875	Rush Medical College.....	1865
					Univ Med. College, N. Y..	1866
Johnson, G. L.....	1874		Denver.....	1875	Med. Dept. Iowa University	1872
LeCarpentier, Jules.	1875		Fairplay.....	1876	University Paris.....	1865
Davis, M. J.....	1872		Golden.....	1876		
Thacker, W. H.....	1871		Denver.....	1876	Med. Dept. Univ. Michigan.	1862
Boone, S. H.....	1873		Denver.....	1877	University Louisville, Ky...	1857
Lansingh, K. V. R..	1876		Denver.....	1879	Albany Medical College....	1870
Dickinson, J. S.....	1871		Denver.....	1879	Royal College Surg. Eng....	
Taylor, R. T.....	1873		Leadville.....	1882		
Gambell, F. W.....	1881		Leadville.....	1882	Detroit Medical College.....	1873
Warn, W. H.....	1879		Denver.....	1882	Coll. Phys. and Surg., N. Y.	1871

NAME.	Year Elected	Age.	Residence at Death.	Date of Death.	MEDICAL COLLEGE.	Year Grad.
Wilson, M. A.....	1880		Denver.....	1882.....	Ohio Medical College.....	1866
Craven, J. S.....	1880		Pueblo.....	1884.....	Iowa State Univ. Med. Dept.	1867
Griffith, D. S.....	1882		Durango.....	1886.....	Jeff. Medical College.....	1863
MacLean, A. M....	1881		Leadville.....	1886.....	Med. Dept. Univ. of Mich.. / Univ. Nashville, Med. Dept.	1874 / 1863
Mavity, W. K.....	1884		Denver..	1886.....	Jeff. Med. College.....	1865
McMurtie, G. S....	1873	61	Denver.....	August, 1887..	Univ. Penn. Med. Dept.....	1860
Buckingham, R. G..	1871	73	Denver.....	March 18, 1889	Berkshire Med. College.....	1836
Lathrop, Charles C..	1877	36	Denver.....	May 28, 1889..	Bellevue Hosp. Med. Coll...	1875
Fay, William M....	1883	33	Denver.....	Jan'y 13, 1889.	Kansas City Med. College...	1881
Brumond, P. B.....	1884	43	Idaho Springs	Sept. 13, 1889.	Chicago Medical College....	1868
Grimes, W. S.....	1883	53	Denver.....	Dec. 21, 1889..	Miami Medical College.....	1857
James, H. C.....	1881	50	Ouray.....	Jan'y 4, 1890..	Jeff. Medical College.....	1870

NAME.	Year Elected	Age.	Residence at Death.	Date of Death.	MEDICAL COLLEGE.	Year Grad.
Wooster, David.....	1888	37	Idaho Springs	April 8, 1891.	Med. Dept. Univ. of Cal.....	1885
Keables, E. H.....	1888	71	Alma.....	Jan'y 6, 1892.	Bellevue Hosp. Med. Coll..	1861
Cory, J. B.....	1883	54	Denver.....	Jan'y 24, 1892	Med. Dept. Univ. Michigan	1862
Worthington, R. H .	1884	46	Denver.....	May 13, 1892..	Med. Dept. Univ. of Denver	1884
Parker, C. M.....	1873	54	Denver.....	Aug. 12, 1892.	Univ. of Louisiana.....	1859
					Med. College of Virginia..	1862
Wicks, E. G.....	1889	34	Denver.....	Aug. 26, 1892.	Med. Dept. Univ. of Md.....	1888
Davis, J. C.....	1880	66	Zurich, Switz.	Oct. 8, 1892..	Castleton Medical College...	1847
Steele, H. K.....	1871	68	Denver.....	Jan'y 20, 1892.	University City of New York	1848
Williams, W. H....	1871	53	Denver.....	March 15, 1893	University of Louisiana....	1867
Keating, J. M.....	1892	42	Colo. Springs.	Nov. 18, 1893.	University of Pennsylvania.	1873
Finfrock, J. H.....	1885		Boise City, Ida.	February, 1894	Medical College of Ohio....	1863
Tucker, B. St. George	1880	55	Colo. Springs.	March 30, 1894	University City of New York	1860
Reed, Chas. M.....	1894	24	Dotsero, Colo.	Sept. 29, 1894.	Univ. of Louisville.....	1892
Scully, D. J.....	1893	33	Lindsay, Ont.	April 21, 1895.	McGill University.....	1887
Powers, J. W.....	1892	37	Salt Lake City	March 25, 1895	Rush Medical College.....	1885

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